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**THE PERCENTAGE DISTRIBUTION OF DENIKER'S SIX EUROPEAN
RACES IN MALE STUDENTS AT THE UNIVERSITY OF
STELLENBOSCH**

by

J. H. SKINNER

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With 109 Tables and 27 Text-figures

Submitted: February, 1955

ABSTRACT

In this investigation 300 students were somatotyped. From the somatoscopic observations it was found that 6.33% are red-haired, while black and light blond hair is practically absent. By the method of a 6-character combination the percentage distribution of Deniker's six anthropological European races was determined. Only 17 (5.67%) are racially "pure", the rest are made up of components of the races as enumerated. The frequencies of the racially "pure" individuals are as follows: Nordic race, 1.33%; Dinaric race, 1.33%; Atlanto-Mediterranean race, 1.00%; Alpine race, 1.00%; Mediterranean race, 0.67%; East Baltic race, 0.33%.

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I INTRODUCTION

This paper is an account and an analysis of somatometrical and somatoscopic observations carried out on 300 male students at the University of Stellenbosch during the period 1953-54. The field and scope of the investigation was originally suggested to me by Dr. C. S. Grobbelaar, senior lecturer in Zoology and Physical Anthropology at the University of Stellenbosch.

The first part is a contribution to the somatometry and cephalometry of the students investigated; the second part is an account of their non-metrical characteristics, of which only the most important, such as eye colour, hair colour and untanned skin colour were selected. The third part is devoted to a determination of the percentage distribution of Deniker's six European races. This was attempted by applying the criteria used by Deniker (1904) and Schlaginhaufen (1927, 1946) for defining the European races, and then sorting out the various 6-character combinations to determine the number of combinations corresponding to those typical for a given race. It is the first time that an attempt of this kind to investigate the composition of the European population, as reflected in the university male student population, has been made in South Africa. In a paper (in the press) on the physical anthropology of the Hottentot tribe known as the Koranas, Grobbelaar has likewise used the 6-character combination with highest incidence to describe the racial type of the tribe.

Van der Westhuysen (1929) undertook an anthroposcopical and anthropometrical study on 128 Afrikaans-speaking students at the University of Stellenbosch. This investigation was the first definite contribution to the physical anthropology of the male European population. Unfortunately the number of subjects (128) is too small for purposes of comparison and a statistical analysis of the measurements is not given. Murray (1932) reported on the physique and nutritional status of the sociological group then known in the Union of South Africa as the Poor Whites; subsequently this group has disappeared as a sociological entity. The only anthropometrical measurements taken, were sitting height, circumference of chest and weight of body. Murray's figures, however, are useless for purposes of comparison, because he has failed to describe the technique employed for taking the measurements concerned. In a contribution: "A South African Grid for Height and Weight Growth of European School Children" by Cluver et al. (1945), the average height and weight of the different age groups of South African boys and girls are recorded, and a grid constituted on the same basis as that used by Wetzel (1941) for American children. The grid presented, is, however, unconvincing: the number for each age group is inadequate; the origin (geographic distribution) of the boys and girls is not given, although it is claimed that the results are applicable to the entire European child population of South Africa; and there is not the slightest reference to the method and technique employed for taking the body height. Other publications containing anthropometrical data about South African boys and girls are: "Training and Efficiency" (Jokl, 1941); "Height, Weight and Body Index of School Children" (Jokl, 1946); and "Die Groei van Suid-Afrikaanse Kinders van 6 tot 16 Jaar" (Postma, 1950). With the exception of van der Westhuysen's (1929) work, the only somatoscopic study done on Europeans, is that of Grobbelaar (1952): "The Distribution of and Correlation between Eye, Hair and Skin Colour in Male Students at the University of Stellenbosch".

II ACKNOWLEDGEMENTS

I would like to express my sincere thanks to Dr. C. S. Grobbelaar for his constant advice and constructive criticism in connection with this investigation. To Prof. C. G. S. de Villiers I am indebted for his continued interest in this investigation and for his much valued advice on somatoscopic technique.

III MATERIAL

The subjects were male students in their first to fifth year of residence at the University of Stellenbosch. They were selected at random so that by far the greater majority were Afrikaans-speaking, whose ancestors in diminishing order of frequency, were Dutch, German, French and English or Scotch. The remainder were descended from English, German, Dutch or Jewish parents, who were either born abroad or had in recent years settled in the Union of South Africa. The material, therefore is typical of the racial character of the male European university students of those universities where the majority of the students is Afrikaans-speaking.

The anthropometrical measurements were taken of 300 students, whose ages ranged from 17 to 24 years of age with an average of 19 years. In Table 1 the number in each age group is recorded to the nearest whole year, for example all those between 17 years and 6 months and 18 years and 5 months constitute the 18-year-old group. From this it is evident that all the subjects had already passed the adolescent stage, 65% were from 18 to 20 years, and relatively few were older than 20 years. Considering further that the increase in body measurements between 19 and 24 years is negligible for the purpose of this investigation, the 300 subjects can be regarded as a 19-year-old group of students.

Table 1

Age, Years	Frequency	
	absolute	%
17	7	2.33
18	62	20.67
19	80	26.67
20	53	17.67
21	39	13.00
22	16	5.33
23	21	7.00
24	22	7.33

The numbers from the various provinces, Rhodesia and South-West-Africa were: Cape Province 210, Transvaal 39, the Orange Free State 32, Natal 8, South-West-Africa 8, and Rhodesia 3.

IV METHOD AND TECHNIQUE

The anthropometrical measurements and descriptive characteristics required, were recorded on a measurement form. The number and nature of the measurements were naturally determined by the aim of this study. These measurements were:

A METRICAL CHARACTERS

(a) Measurements

- | | |
|---------------------------|--------------------------------------|
| 1 Stature | 6 Maximum bizygomatic diameter |
| 2 Span | 7 Morphological height of face |
| 3 Sitting height | 8 Physiognomical upper facial height |
| 4 Maximum length of head | 9 Height of nose |
| 5 Maximum breadth of head | 10 Width of nose |

From these measurements the value of each, relative to stature, was also calculated, as well as the following indices:

Index cephalicus
Morphological facial index
Physiognomical upper facial index
Transverse cephalo-facial index
Nasal index
Transverse nasio-facial index
Sagittal nasio-facial index
Nasal width-facial height index.

For these absolute measurements and relative values the following statistical constants were calculated:

Arithmetic mean M
Median
Mode
Range V
Mean deviation ϵ
Standard deviation δ
Coefficient of variation of the mean deviation w
Coefficient of variation of the standard deviation v
Probable error of the mean m

The measurement form was planned as follows: on the left information about the subject himself, place and time of observation are recorded. The rest of the space is used for recording the measurements and non-metrical characters. The abbreviations A, BC and SC below the measurements refer to the instrument used for taking that particular measurement. The blank spaces at the top are for recording the absolute measurements. By this arrangement the total number of forms can be superimposed so that all spaces with the same number come to lie upon one another. The series of values pertaining to any particular measurement are thus directly available for further use, and there is no need for rewriting them on a separate list. The spaces for the relative values and indices are arranged along the bottom just above a space for general remarks and the 6-character combination. The spaces in the middle of the form are for recording the non-metrical or descriptive characters.

(b) Measuring instruments

The measuring instruments were the anthropometer, spreading caliper, and sliding caliper, devised and described by Martin (1928) and used universally. The definitions of measurements in terms of fixed landmarks on the body, commonly termed the measuring points ("Messpunkte"), and the method of using an instrument for a particular measurement have been very fully described by Martin (1925, 1928), Wilder (1920), Schultz (1937), and Hooton (1946).

No.	Name of subject		1	2	3	4	5	6	7	8	9	10		
	Place of residence													
Date of birth			Stature A	Span A	Sitting height A	Maximum length of head BC	Maximum breadth of head BC	Maximum bizygomatic diameter BC	Morphologi- cal height of face SC	Physiognom. upper facial height SC	Height of nose SC	Width of nose SC		
Date of observation			Form of hair	Stiff	Straight	Waves flat	Waves broad	Waves narrow	Curly	Locky	Eye colour			
											Martin No.	Remarks		
Age: Years Months Days			Skin colour von Luschka No.	ANTHROPOLOGICAL EXAMINATION FORM			Hair colour Fischer No.		Profile of nose		Profile of occiput			
				Inguinal region of abdomen	Name of observer			Hair on scalp						
			Areola				Hair around genitalia							
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Relative width of span	Relative sitting height	Relative length of head	Relative breadth of head	Relative bizygom. diameter	Relative morpho. height of face	Relative physiog. upper facial height	Index cephalicus	Morpho. facial index	Physiog. upper facial index	Sagittal nasio- facial index	Transverse nasio- facial index	Nasal index	Transverse cephalo- facial index	Nasal width facial height index
2×100	3×100	4×100	5×100	6×100	7×100	8×100	5×100	7×100	8×100	9×100	10×100	10×100	6×100	10×100
1	1	1	1	1	1	1	4	6	6	7	6	9	5	7
A Anthropometer			General Remarks					Six- character combination		Morpho. facial index	Nasal index	Eye colour	Hair colour	
BC Spreading caliper										Index cephalicus	Stature			
SC Sliding caliper														

B NON-METRICAL CHARACTERS

The following non-metrical characters were determined: eye colour and the distribution of the anterior pigment of the iris, hair colour, skin colour, form of the hair, profile of the occiput and the nose, and the shape of the eye with regard to the form of the upper lid or the degree of epicanthus.

For the determination of eye colour, hair colour and skin colour the following colour tablets were used: Martin's eye colour tablet ("Augenfarbentafel"), Fishcer's hair colour tablet ("Haarfarbentafel") and von Luschan's skin colour tablet ("Hautfarbentafel").

The investigation of the eye colour comprised observations on the distribution and colour of pigment in the anterior surface of the iris. For this determination the subject stands near the window and looks straight through it with the head held in such a position that the face is uniformly illuminated. To avoid any shadows, the observer stands slightly to the right or the left of the subject—to his left in the case of brown, to his right in the case of blue eyes. The eye colour tablet is held over the subject's forehead and the number of the colour or colour combination corresponding to that of the eye colour is noted. Schlaginhaufen (1946) recommends holding the tablet up against the left or the right cheek in the case of brown or blue eyes respectively.

The hair colour recorded was that of the hair on the vertex of the head. Wherever there was a difference in the shade between the colour of the hair at the apices and that part of the hair nearer to the roots, it was the latter colour that was chosen. In the case of the hair around the genitalia, the colour recorded was that of the hair immediately around the root of the penis. That of the peripheral hair was in most cases a shade lighter.

When seen in light reflected at a certain angle from its surface, brown hair of the head and the genitalia often looks shiny and faintly reddish. To eliminate this disturbing factor, also mentioned by van der Westhuysen (1929) and Grobbelaar (1952), a bundle of hair was taken between the thumb and index finger, twisted into a spiral coil and for matching was superimposed on the hair tufts of the hair colour tablet. When the colour of the hair on the head is recorded, the subject stands in front of a large window through which the daylight enters, with his head slightly bent forward and downward so that the light falls uniformly over the top of the head. The observer stands slightly to the right or the left of the subject to avoid any shadow on the hair. In taking the colour of the hair around the genitalia, the subject grips the frame of the hair colour tablet between the tips of his fingers and the palm of the hand, and holds the tablet upside down and vertically next to and level with the hair around the genitalia—in the case of brown hair, he holds the frame in his right, and in the case of reddish hair in his left hand. In the same way as described above, a tuft of hair is taken between the thumb and index finger, twisted and superimposed on the hair around the genitalia until the number or combination of numbers corresponding to the hair colour is found.

The untanned colour of the skin was recorded for the skin immediately above the inguinal region. The areola of the breast was also observed. The subject stands up straight, the arms hanging down at the side of the body to prevent folding or stretching of the skin. The subject faces the window with the front of the body uniformly illuminated. For the observation of the skin colour above the inguinal region, his short pants were lowered on the right side only until the required skin area became exposed. That part of the skin colour tablet containing the number of the matching skin colour was held at a slant up against the surface of the exposed skin. The number of cor-

responding colour on the tablet was found by moving the tablet slightly to the right or left until a colour was found that blended with the skin colour. This blending of the two colours is best seen when one compares the tablets' colours with those of the skin through partly closed eyes. The colour of the areola of the breast was recorded in the same way.

V SEQUENCE OBSERVED DURING THE INVESTIGATION

1 The subject dressed only in short loose fitting pants stands with his back up against a vertical wall and according to the instructions of the observer, brings his head into the Frankfurter plane position. With the anthropometer in his right hand and standing on the subject's right side he measures the—

Height of body.

2 The subject takes a step forward, extends his arms sideways for the measurement of the—

Width of span.

3 The subject then seats himself on a specially constructed stool and on the instructions of the observer adjusts himself for the measurement of the—

Sitting height.

4 While the subject is sitting, the observer exchanges the anthropometer for the spreading caliper and measures the—

Maximum length of the head,

Maximum breadth of the head,

Maximum bizygomatic diameter.

5 The spreading caliper is replaced, and with the sliding caliper, the observer measures the—

Morphological height of the face,

Physiognomical upper facial height,

Height of the nose,

Width of the nose.

6 The subject faces the window, and with the eye colour tablet in the right hand the observer determines the—

Eye colour, and the nature and distribution of the pigment on the anterior surface of the iris.

7 The eye colour tablet is then exchanged for the hair colour tablet for the determination of the—

Hair colour.

8 The hair colour tablet is replaced, and with the skin colour tablet in his right hand, the observer determines the—

Untanned skin colour,

Colour of the areola.

9 The observer then determines the—

Form of the hair,

Profile of the nose and occiput,

Nature of epicanthus (if any),

Nature of supernumerary mammae (if any).

VI DISCUSSION

A METRICAL CHARACTERS

1 Height of body

Figure 1

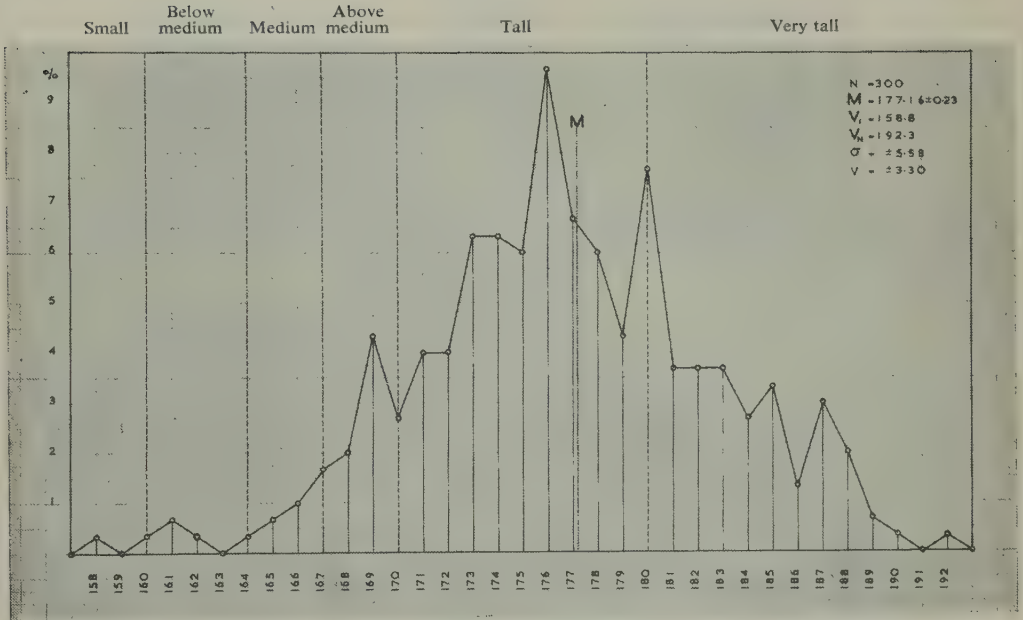


Table 2

M	m	ϵ	δ	w	v	V_l	V_n
177.16 \pm 0.23		4.63	5.85	2.61	3.30	158.8	192.3

The stature of 300 male students was recorded and the statistical values calculated. The height of body ranges from 158.8 cm. to 192.3 cm., i.e. a difference of 33.5 cm. between the shortest and the tallest about a mean value of 177.16 ± 0.23 cm. The variability is characterized by a mean deviation (ϵ) of 4.63 cm., and a standard deviation (δ) of 5.85 cm. The coefficients of variation of ϵ and δ are: $w = 2.61$ and $v = 3.30$ (Table 2 and Fig. 1).

Table 3

Category	Class boundaries	Frequency	
		absolute	%
Dwarfish	—129·9		
Very small	130·0—149·9		
Small	150·0—159·9	1	0·33
Below medium... ..	160·0—163·9	4	1·33
Medium	164·0—166·9	6	2·00
Above medium	167·0—169·9	24	8·00
Tall	170·0—179·9	168	56·00
Very tall	180·0—199·9	97	32·33
Gigantic	200·0—		

Tables 3 and 4 are grouped frequency tables for the data with respective class boundaries and class values as given by Martin (1928).

Table 4

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
158	1	0·33	176	29	9·67
159			177	20	6·67
160	1	0·33	178	18	6·00
161	2	0·67	179	13	4·33
162	1	0·33	180	23	7·67
163			181	11	3·67
164	1	0·33	182	11	3·67
165	2	0·67	183	11	3·67
166	3	1·00	184	8	2·67
167	5	1·67	185	10	3·33
168	6	2·00	186	4	1·33
169	13	4·33	187	9	3·00
170	8	2·67	188	6	2·00
171	12	4·00	189	2	0·67
172	12	4·00	190	1	0·33
173	19	6·33	191		
174	19	6·33	192	1	0·33
175	18	6·00			

The values in the above table were not recorded to the nearest whole number so that the value recorded as 176 cm. includes all values between 176·0 and 176·9 cm. The median was found to be 175 cm. and the mode 176 cm.

When one considers the mean value in conjunction with the data presented in Table 3, it is evident that the students under consideration belong to a tall people.

In Table 5 the height is given, amongst others, of those European races from which the ancestors of the South African students have come. They belong to the tallest races of Europe.

Table 5

Race	Mean stature	Author
Hollanders	167·5	Deniker*
Swiss (recruits)	168·56	Schlaginhaufen 1946
French (Parisians)	169·2	Keiter 1941†
Irish	172·6	Beddoe*
English	172·8	Pearson*
Leipzig students	173·08	Arnold 1931†
Scottish	174·6	Beddoe*
South African (students)...	175·7	van der Westhuysen 1929
Americans (students)	176·35	Grey and Ayres 1931†
South African (students)...	177·16	Author

* Quoted by Martin (1928).
† Quoted by Krogman (1941).

The American students, the second tallest in the series in Table 5, belong to the same age group (19 years) as the sample of university students under consideration and they are drawn from economically independent families. Van der Westhuysen (1929, p. 12) maintains that his students were tall because practically all of them come from the country and have not during the greater part of their lives been exposed to the “stunting influences of city life”. This inference is incorrect in the light of what is known about the body measurements of European students from rural areas compared with those of the same age from cities. The results of the investigations of Schwerz, Brynn and Hannesson, as summarized by Martin (1928), and those of Korpershoek (1926) all show that boys of school-going age, boys at school and the younger university students who come from cities are taller than those of the same age groups from rural areas, but that in the former there is a retardation in the breadth measurements in comparison with the body length. Schlaginhaufen (1946) has also pointed out that there is an annual increase in stature of recruits of the same age groups. The number of students measured by van der Westhuysen (1929) is rather small for purposes of direct comparison.

2 *Sitting Height*

The statistical characters of the sitting height are as follows: the mean value $91\cdot88 \pm 0\cdot12$ cm. for a range of 81·3 cm. to 100·4 cm., the median 90 cm., and mode 94 cm. (Table 6 and Fig. 2).

The seven categories into which the values of the sitting height are divided, are recorded in Table 7. More than one half (57·67%) fall within the group “above medium” which is to be expected with an average of $91\cdot88 \pm 0\cdot12$ cm. and a modal value of 94 cm.

Figure 2

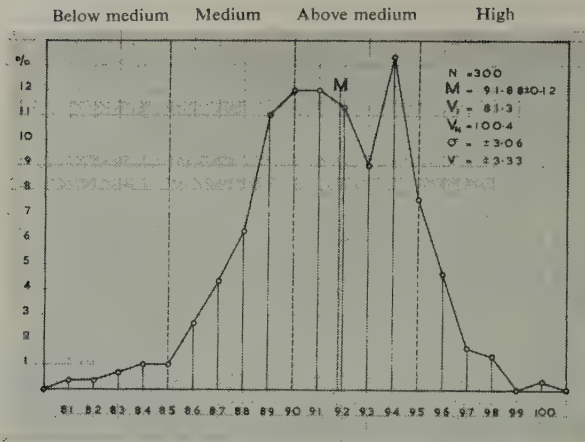


Table 6

M	m	ϵ	δ	w	v	V_1	V_n
91.88 ± 0.12		2.45	3.06	2.67	3.33	81.3	100.4

Table 7

Category	Class boundaries	Frequency	
		absolute	%
Exceptionally short ...	—69.9		
Very short ...	70.0—74.9		
Short ...	75.0—79.9		
Below medium...	80.0—84.9	7	2.33
Medium ...	85.0—89.9	73	24.33
Above medium ...	90.0—94.9	173	57.67
High ...	95.0—	47	15.67

Table 8 is a grouped frequency table for the data of the sitting height at class intervals of 1 cm. The class values are not recorded to the nearest whole number, but so that, for example, 81 cm. includes all values from 81.0 cm. to 81.9 cm.

3 Relative sitting height

The small range (47.3—55.1) and the small values for ϵ , δ , w and v, in comparison with the similar values for stature and sitting height, are significant. They show that the build of body, in so far as it concerns the length of the rump relative

Table 8

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
81	1	0.33	91	36	12.00
82	1	0.33	92	34	11.33
83	2	0.67	93	27	9.00
84	3	1.00	94	40	13.33
85	3	1.00	95	23	7.67
86	5	1.67	96	14	4.67
87	13	4.33	97	5	1.67
88	19	6.33	98	4	1.33
89	33	11.00	99		
90	36	12.00	100	1	0.33

Figure 3

Hypermicroscler Macrosccler Mesoscler Brachyscler

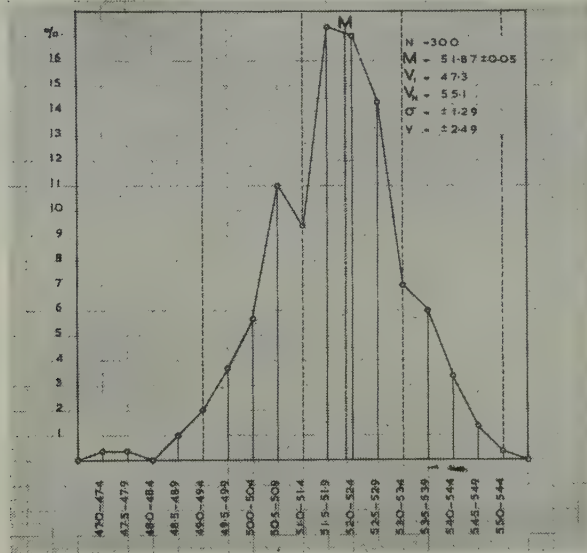


Table 9

M	m	ϵ	δ	w	v	V_1	V_n
51.87 ± 0.05		1.01	1.29	1.94	2.49	47.3	55.1

to the stature, is much more uniform than are the absolute values for these two characters. In this relation the homogeneous nature of the material under discussion becomes apparent (Table 9 and Fig. 3).

The frequency of occurrence of the data at class intervals of 1·0, is as follows:

Table 10

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
47	2	0·67	52	94	31·33
48	3	1·00	53	39	13·00
49	17	5·67	54	14	4·67
50	50	16·67	55	1	0·33
51	80	26·67			

Table 10 also demonstrates the homogeneous nature of the material, since three-quarters of the values fall within two class values about the mean value.

According to the classification of Giuffrida-Ruggeri (Schlaginhaufen, 1946) more than one-half of the students are mesatiscelic with a tendency towards the macroscelic condition as indicated by the next highest frequency value (22·33%), as well as by the arithmetic mean of $51·87 \pm 0·05$ which falls below the class-mid-mark (52·0) of the group "mesatiscelic" (Table 11).

Table 11

Category		Class boundaries	Frequency	
			absolute	%
Hypermacroscleric	...	—48·9	5	1·67
Macroscleric	...	49·0—50·9	67	22·33
Mesatisccleric	...	51·0—52·9	174	58·00
Brachyscleric	...	53·0—54·9	53	17·67
Hyperbrachyscleric	...	55·0—	1	0·33

4 Width of span

The absolute average width of span is greater than the stature although some individuals are occasionally found with an absolute span less than the stature. In six individuals of the 300 measured, the span is less than the stature. The average for a range of 163·1 cm. to 205·6 cm. was found to be $184·82 \pm 0·28$ cm., the mean deviation (ϵ) 5·76, the standard deviation (δ) 7·11 and the coefficients of variation of ϵ and δ : $w = 3·12$ and $v = 3·85$ (Table 12 and Fig. 4).

Figure 4

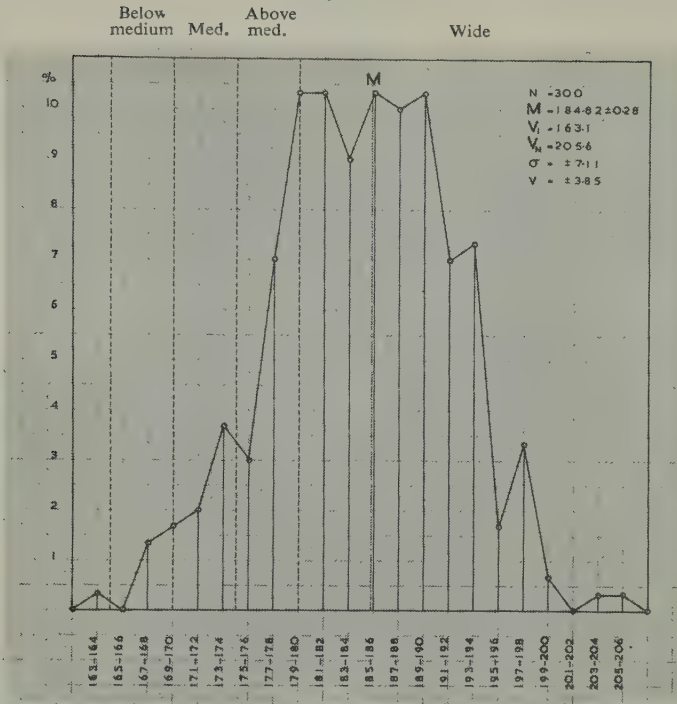


Table 12

M	m	ϵ	δ	w	v	V_l	V_n
184.82	± 0.28	5.76	7.11	3.12	3.85	163.1	205.6

Grouped at class intervals of 6 cm. (Table 13) according to Bryn (Schlaginhausen, 1946) the most frequently occurring values are those between the class boundaries 181—186 cm. (29.67%), 187—192 cm. (27.33%), and 175—180 cm. (20.33%).

Table 13

Class boundaries	Frequency		Class boundaries	Frequency	
	absolute	%		absolute	%
163—168	5	1.67	187—192	82	27.33
169—174	22	7.33	193—198	37	12.33
175—180	61	20.33	199—204	3	1.00
181—186	89	29.67	205—	1	0.33

5 Relative width of span

Figure 5

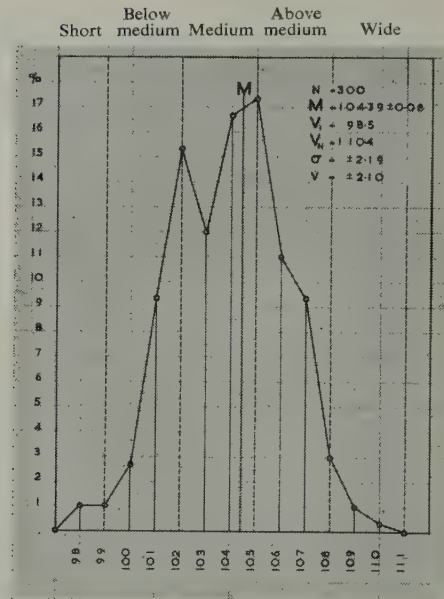


Table 14

M	m	ε	δ	w	v	V ₁	V _n
104.39 ± 0.08		1.83	2.19	1.75	2.10	98.5	110.4

Expressed as a percentage of the stature, the width of the span varies from 98.5 to 110.4 about a mean value of 104.39 ± 0.08 , a mode of 105 and a median of 104 (Table 14 and Fig. 5). The students (177.16 cm.) are 6.60 cm. taller than the Swiss recruits (168.56 cm.) and the mean absolute width of their span (184.82 cm.) is 8.68 cm. more than that of the Swiss recruits (176.14 cm.). However, the difference between the stature and the absolute width of the span is very nearly the same in both cases: 7.58 cm. for the Swiss recruits and 7.66 cm. for the South African students. It is, therefore, not surprising to find that the average relative width of the span of the Swiss recruits (104.51) exceeds that of the South African students (104.39) by 0.12%. The circumstance that tall people have an average relative width of span less than that of short people, was demonstrated by Bach (Martin, 1928). The width of the span increases with the increase in stature, but since the rate of increase in the former is slower than that in the latter, the relative width of span diminishes.

Table 15 is a grouped frequency table for the data of the relative width of span recorded at class intervals of 3.0.

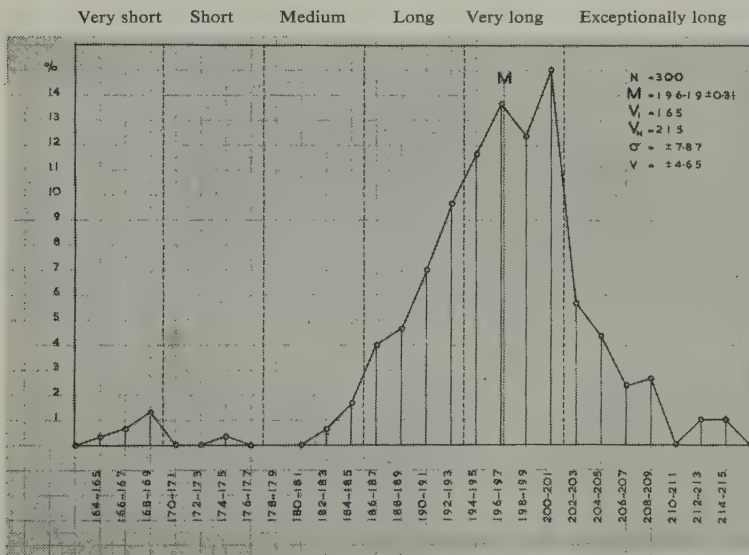
Table 15

Category	Class boundaries	Frequency	
		absolute	%
Very short	— 95·9		
Short	96·0—98·9	3	1·00
Below medium... ..	99·0—101·9	39	13·00
Medium	102·0—104·9	132	44·00
Above medium	105·0—107·9	113	37·67
Wide	108·0—110·9	13	4·33
Very wide	111·0—		

The most frequently occurring values are those between the class boundaries 102·0—104·9 (44·00%), 105·0—107·9 (37·67%) and 99·0—101·9 (13·00%). The relative width of the span can therefore be regarded as “medium” with a tendency towards the category “above medium” as indicated by a second highest frequency for this group as well as by the circumstance that the mean value falls very near to the boundary between the two groups.

6 Length of head

Figure 6



The arithmetic mean value for the maximum length of the head is 196·19 ± 0·31 mm., with a range of 165 mm. to 215 mm. (Table 16 and Fig. 6). Classified

Table 16

M	m	ϵ	δ	w	v	V _l	V _n
196.19 \pm 0.31		5.40	7.87	3.19	4.65	165	215

into groups with an 8 mm. range according to Lebzelter and Saller (Schlaginhaufen, 1946) the results are as follows:

Table 17

Category	Class boundaries	Frequency	
		absolute	%
Exceptionally short ...	—161		
Very short ...	162—169	7	2.33
Short ...	170—177	1	0.33
Medium ...	178—185	7	2.33
Long ...	186—193	76	25.33
Very long ...	194—201	158	52.67
Exceptionally long ...	202—	51	17.00

From Table 17 it is evident that the long-headed type (absolute length) predominates, only 5% having very short to medium long heads. Van der Westhuysen's (1929) mean value of 197 mm. as well as mine (196.19 \pm 0.31 mm.) falls within the category "very long".

Table 18

Nationality	M	m	δ	v	Author
Swiss (recruits)	189.0 \pm 0.04		6.90	3.65	Schlaginhaufen 1946
Germans (students) ...	189.42 \pm 0.45		6.62	3.18	Kretschmar* 1932
French ...	190.42				Collignon†
Hollanders ...	190.9				Bolk 1920
English and Welsh ...	195.3 \pm 0.81			3.62	Fleming* 1933
South African (students) ...	196.19 \pm 0.31		7.87	4.65	Author

* Quoted by Krogman (1941).

† Quoted by Schlaginhaufen (1946).

From Table 18 it is evident that the students investigated are slightly more variable in the absolute length of the head than are the Swiss recruits and the German students who fall in the same group. The coefficient of variation (v) of the standard deviation (δ) also indicates a greater relative variability in the South African students than in the Swiss recruits or the German students.

7 Relative length of head

Figure 7

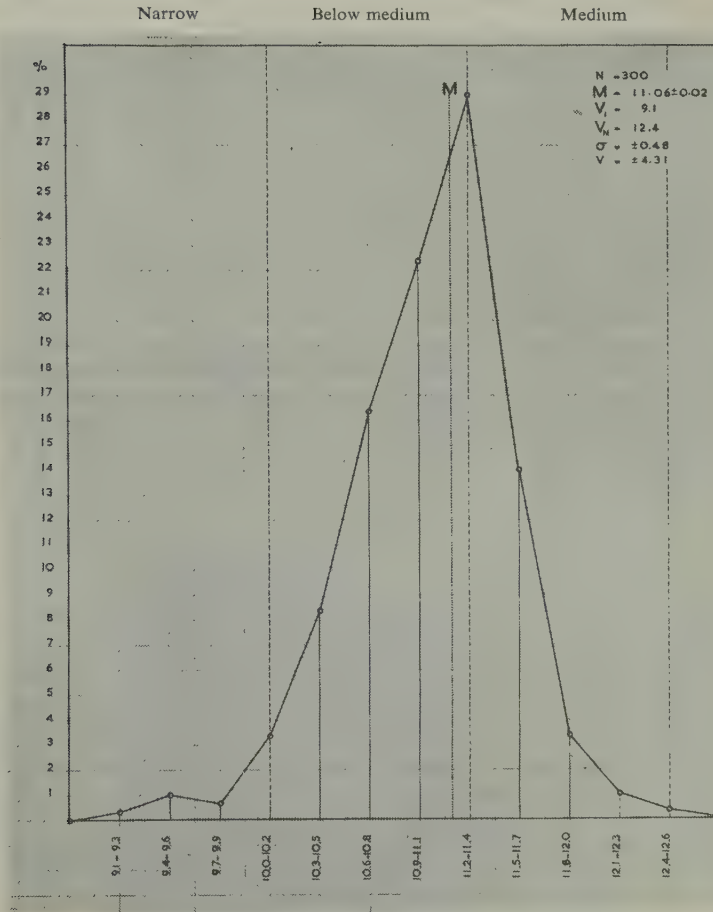


Table 19

M	m	ϵ	δ	w	v	V_l	V_u
11.06 \pm 0.02		0.37	0.48	3.32	4.31	9.1	12.4

The relative length of the head of the 300 students varies from 9.1 to 12.4 with a mean value of 11.06 ± 0.02 (Table 19 and Fig. 7). The small range of variation of the relative length of the head ($\epsilon = 0.37$ and $\delta = 0.48$) is an expression of the uniformity of the material. This uniformity is also evident from Table 20 where the

data of the relative length of the head are grouped at class intervals of 0.6. The two groups with class boundaries 10.6—11.1 and 11.2—11.7 embrace 38.67% and 43.00% respectively of all the individuals, i.e. in 81.67% the range of variation of the relative length of the head, is small.

Table 20

Class boundaries	Frequency		Class boundaries	Frequency	
	absolute	%		absolute	%
— 9.3	1	0.33	11.2—11.7	129	43.00
9.4— 9.9	5	1.67	11.8—12.3	13	4.33
10.0—10.5	35	11.67	12.4—12.9	1	0.33
10.6—11.1	116	38.67			

Although the average absolute length of the head of the Swiss recruits (Table 19) is 7.19 mm. less than that of the students, they have relatively larger heads since their average relative value (11.22) exceeds that of the students (11.06) by 0.16.

8 Breadth of head

Figure 8

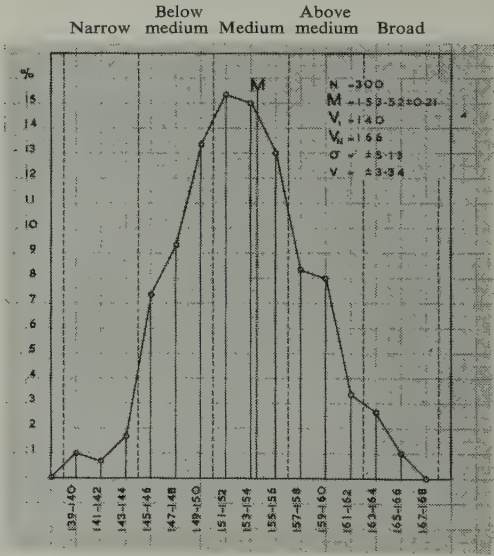


Table 21

M	m	ε	δ	w	v	V ₁	V _n
153.52 ± 0.21		4.17	5.13	2.72	3.34	140	166

The maximum breadth of the head of the 300 students varies from 140 mm. to 166 mm. about a mean value of 153.52 ± 0.21 mm. (Table 21 and Fig. 8).

Classified into groups with a 6 mm. range, the most frequently occurring values are those between the class boundaries 151—156 mm. within which the arithmetic mean also lies. With 30.00% belonging to the group “below medium”, it is evident that there is a slight tendency towards that group in spite of the fact that the mean value (153.52 ± 0.21 mm.) lies slightly above the class-midmark of the group “medium” (Table 22).

Table 22

Category	Class boundaries	Frequency	
		absolute	%
Very narrow	—138		
Narrow	139—144	10	3.33
Below medium... ..	145—150	90	30.00
Medium	151—156	130	43.33
Above medium	157—162	59	19.67
Broad	163—168	11	3.67
Very broad	169—		

In comparing Table 23 with Table 18 it is seen that the absolute breadth of the head is one of the lowest, and the absolute length of the head the highest of the selected examples. Of the three groups of the same age, i.e. Swiss recruits, South African students and German students, the variability (absolute and relative) as indicated by δ and v , is the greatest for the Swiss recruits and the least for the German students. Finally the variability of the absolute measurements (length and breadth) of the head is the least in the German students. In the South African students the length of the head shows the greatest variability whereas in the Swiss recruits the breadth is most variable.

Table 23

Nationality	M	m	δ	v	Author
Swiss (recruits)	153.5	± 0.03	5.78	3.67	Schlaginhausen 1946
South African (students)	153.5	± 0.21	5.13	3.34	Author
Hollanders	154.2				Bolk 1920
English and Welsh	154.6	± 0.68		3.83	Fleming 1933*
French	156.83				Collignon†
Germans (students)	158.57	± 0.38	4.98	3.14	Kretschmar*

* Quoted by Krogman (1941).

† Quoted by Schalagginhausen (1946).

9 Relative breadth of head

Figure 9

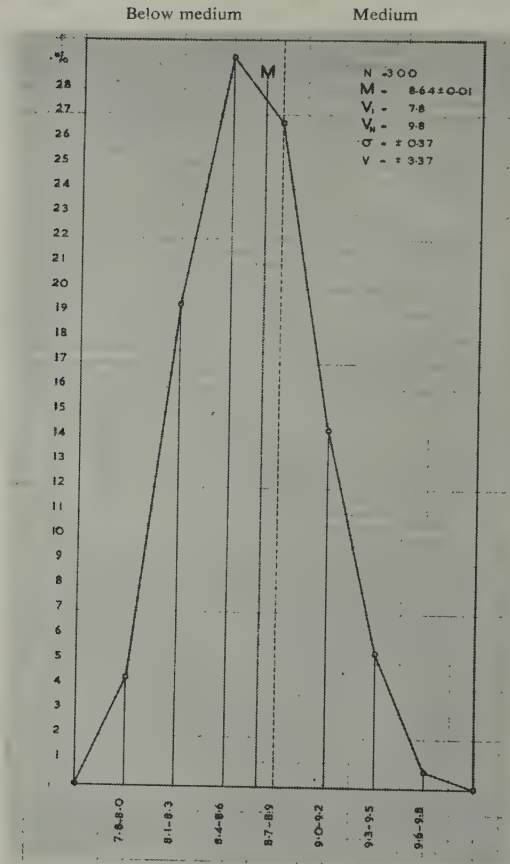


Table 24

M	m	ϵ	δ	w	v	V_l	V_n
8.64 ± 0.01		0.28	0.37	3.26	3.37	7.8	9.8

The maximum relative breadth of the head ranges from 7.8 to 9.8 with an arithmetic mean value of 8.64 ± 0.01 (Table 24 and Fig. 9).

In Table 25 the values are classified in groups with a range of 0.6. The two classes with class boundaries 8.1—8.6 and 8.7—9.2 embrace 48.67% and 41.00%.

Table 25

Class boundaries	Frequency		Class boundaries	Frequency	
	absolute	%		absolute	%
7.5—8.0	13	4.33	8.7—9.2	123	41.00
8.1—8.6	146	48.67	9.3—9.8	18	6.00

respectively of all the individuals, i.e. in 89.67% the range of variation of the relative breadth of the head is small.

The mean value for the absolute breadth of the head is the same as for the Swiss recruits, viz. 153.5 mm. Relative to stature, however, the breadth of the head of the Swiss recruits (9.12) exceeds the value for the South African students (8.64) by 0.48.

10 *Index cephalicus*

Figure 10

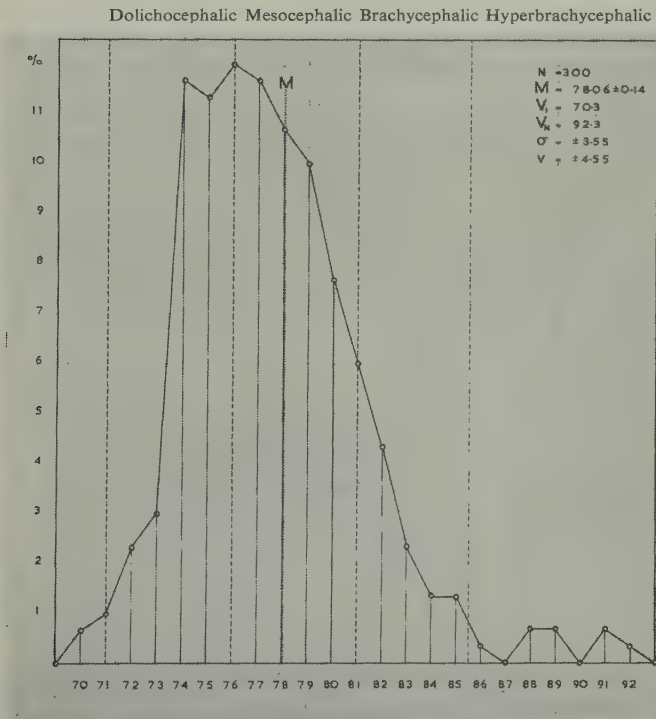


Table 26

M	m	ϵ	δ	w	v	V_1	V_n
78.06 ± 0.14		2.73	3.55	3.50	4.55	70.3	92.3

This index shows considerable variability as indicated by a range of 70.3 to 92.3 about the arithmetic mean value of 78.06 ± 0.14 (Table 26 and Fig. 10). Classified into five groups (Martin, 1928) it is found that approximately 52% are mesocephalic, 30% are dolichocephalic and hyperdolichocephalic, and 18% are brachycephalic and hyperbrachycephalic (Table 27).

Table 27

Category	Class boundaries	Frequency	
		absolute	%
Hyperdolichocephalic...	—70.9	2	0.67
Dolichocephalic ...	71.0—75.9	88	29.33
Mesocephalic ...	76.0—80.9	156	52.00
Brachycephalic ...	81.0—85.4	43	14.33
Hyperbrachycephalic ...	85.5—	11	3.67

In a grouped frequency table (Table 28) with the data at class intervals of 1.0, the mean value 78.06 ± 0.14 lies between the mode (76) and the median (81).

Table 28

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
70	2	0.67	82	13	4.33
71	3	1.00	83	7	2.33
72	7	2.33	84	4	1.33
73	9	3.00	85	4	1.33
74	35	11.67	86	1	0.33
75	34	11.33	87		
76	36	12.00	88	2	0.67
77	35	11.67	89	2	0.67
78	32	10.67	90		
79	30	10.00	91	2	0.67
80	23	7.67	92	1	0.33
81	18	6.00			

Van der Westhuysen (1929) found a mean value of 77.3 which places his students within the mesocephalic group. He remarks: "It would be interesting to ascertain whether this mesocephaly is pointing towards incipient dolichocephaly or

brachycephaly,” (p. 32). A mean value of 78.06 ± 0.14 indicates a tendency towards brachycephaly. The final answer to this question must be left in abeyance until the head indices of a larger number of students have been determined. A value of 78.06 ± 0.14 places the students, probably also the South African European population, within the mesocephalic group.

In Table 29 all the nationalities up to and including the Hollanders are mesocephalic, the rest are brachycephalic.

Table 29

Nationality	Index cephalicus	Author
South African (students)...	77.3	van der Westhuysen 1929
English	77.6	Beddoe†
Scottish	77.8	Beddoe and Venn†
Irish	77.9	Beddoe and Venn†
Americans (students) ...	78.06	Gray and Ayres 1931*
South African (students)...	78.06	Author
Hollanders	80.3	Bolk 1920
Swiss (recruits)	81.31	Schlaginhaufen 1946
French	82.4	Kretschmar 1932*
Germans (students) ...	84.20	Kretschmar 1932*

* Quoted by Krogman (1941).
† Quoted by Martin (1928).

11 Morphological height of face

Figure 11

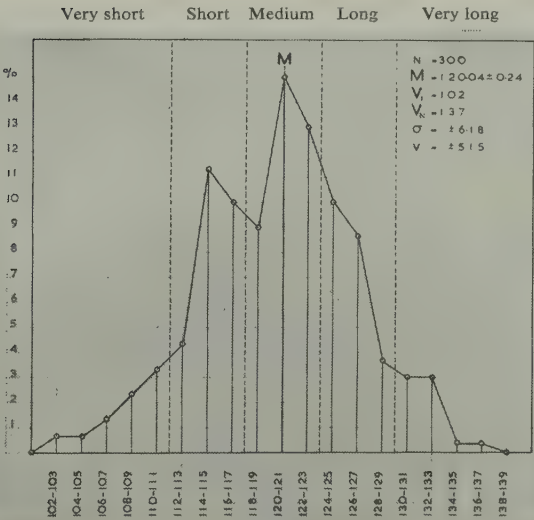


Table 30

M	m	ϵ	δ	w	v	V ₁	V _n
120.04 \pm 0.24		4.89	6.18	4.07	5.15	102	137

This measurement is sometimes referred to as the total facial length. The mean value with a range of 102 mm. to 137 mm. was found to be 120.04 ± 0.24 mm. (Table 30 and Fig. 11). The different measurements were classified into groups with a 10 mm. range (Table 31).

Table 31

Class boundaries	Frequency		Class boundaries	Frequency	
	absolute	%		absolute	%
102—103	2	0.67	120—121	45	15.00
104—105	2	0.67	122—123	39	13.00
106—107	4	1.33	124—125	30	10.00
108—109	7	2.33	126—127	26	8.67
110—111	10	3.33	128—129	11	3.67
112—113	13	4.33	130—131	9	3.00
114—115	34	11.33	132—133	9	3.00
116—117	30	10.00	134—135	1	0.33
118—119	27	9.00	136—137	1	0.33

When the data are grouped according to the classification of Lebzelter and Saller, which is also adopted by Schlaginhaufen (1946), it is found that 37.00% fall within the group "medium". In view of the fact that 25.67% are "short" and 22.33% "long", there is a tendency towards the group "short".

Table 32

Category	Class boundaries	Frequency	
		absolute	%
Very short	—111	25	8.33
Short	112—117	77	25.67
Medium	118—123	111	37.00
Long	124—129	67	22.33
Very long	130—	20	6.67

12 Relative morphological facial height

Figure 12

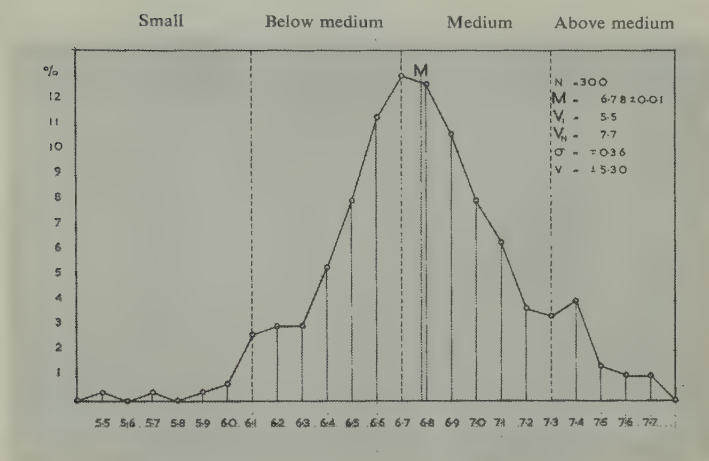


Table 33

M	m	ε	δ	w	v	V ₁	V _n
6.78 ± 0.01		0.28	0.36	4.08	5.30	5.5	7.7

The morphological facial height was calculated in terms of the length of body. The mean value is 6.78 ± 0.01 with a range of 5.5 to 7.7 (Table 33 and Fig. 12). Grouped at class intervals of 0.6 approximately one half (54.33%) falls within the class boundaries 6.7—7.2 and one-third (33.33%) within the boundaries 6.1—6.6, while the mean value of 6.78 ± 0.01 lies very near to the boundary between the two most frequently occurring groups (Table 34).

Table 34

Class boundaries	Frequency	
	absolute	%
—6.0	5	1.67
6.1—6.6	100	33.33
6.7—7.2	163	54.33
7.3—7.8	32	10.67

13 Maximum bizygomatic diameter

Figure 13

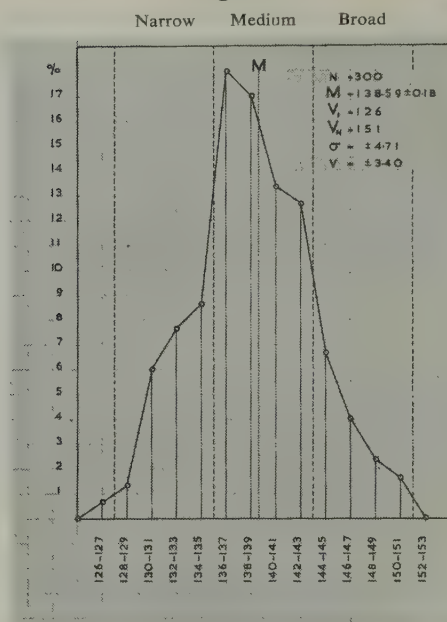


Table 35

M	m	ϵ	δ	w	v	V_1	V_n
138.59 ± 0.18		3.82	4.71	2.76	3.40	126	151

The mean value for the maximum bizygomatic diameter is 138.59 ± 0.18 mm., the maximum value 151 mm., the minimum 126 mm., the median 138 mm. and the mode 137 mm. (Table 35 and Fig. 13). Classified into groups with a 2 mm. range,

Table 36

Class boundaries	Frequency		Class boundaries	Frequency	
	absolute	%		absolute	%
126—127	2	0.67	140—141	40	13.33
128—129	4	1.33	142—143	38	12.67
130—131	18	6.00	144—145	20	6.67
132—133	23	7.67	146—147	12	4.00
134—135	26	8.67	148—149	7	2.33
136—137	54	18.00	150—151	5	1.67
138—139	51	17.00			

the values that occur most frequently lie within the boundaries 136 mm. and 137 mm. The mean value (138.59 ± 0.18) lies within the boundaries 138 mm. to 139 mm., the following and next largest group (Table 36).

Classified into five groups according to Lebzelter and Saller (Schlaginhaufen, 1946), the most frequently occurring values are those between 136 mm. and 143 mm. A mean value of 138.59 ± 0.18 mm. as well as an incidence of 23.67% in the group "narrow", shows that there is a definite tendency in this direction (Table 37).

Table 37

Category	Class boundaries	Frequency	
		absolute	%
Very narrow	—127	2	0.67
Narrow	128—135	71	23.67
Medium	136—143	183	61.00
Broad	144—151	44	14.67
Very broad	152—		

14 *Relative bizygomatic diameter*

Figure 14

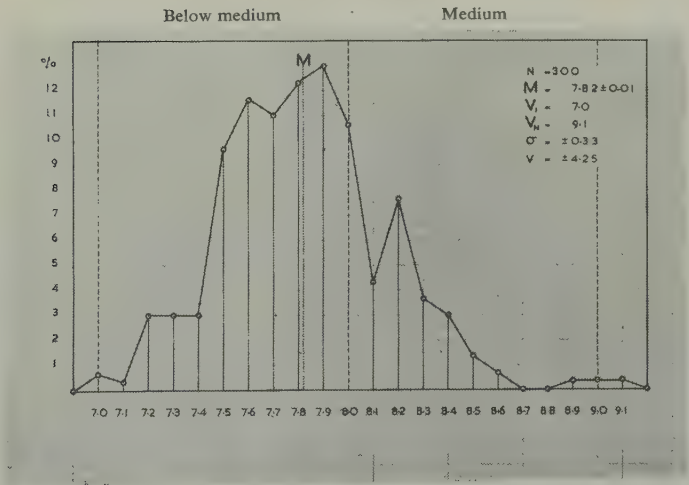


Table 38

M	m	ε	δ	w	v	V _I	V _{II}
7.82 ± 0.01		0.26	0.33	3.29	4.25	7.0	9.1

The mean value of the maximum relative bizygomatic diameter of the 300 students is 7.82 ± 0.01 , the median 8.0 and the mode 7.8, within a range of 7.0 to 9.1 (Table 38 and Fig. 14).

Table 39

Class boundaries	Frequency		Class boundaries	Frequency	
	absolute	%		absolute	%
6.9—7.0	2	0.67	8.1—8.2	36	12.00
7.1—7.2	10	3.33	8.3—8.4	20	6.67
7.3—7.4	18	6.00	8.5—8.6	6	2.00
7.5—7.6	64	21.33	8.7—8.8		
7.7—7.8	70	23.33	8.9—9.0	2	0.67
7.9—8.0	71	23.67	9.1—9.2	1	0.33

In Table 39 the values are classified into groups with 0.2 range. An incidence of 68.33% is practically evenly distributed over three successive groups of which the class boundaries are: 7.5—7.6, 7.7—7.8 and 7.9—8.0.

15 *Morphological facial index*

Figure 15

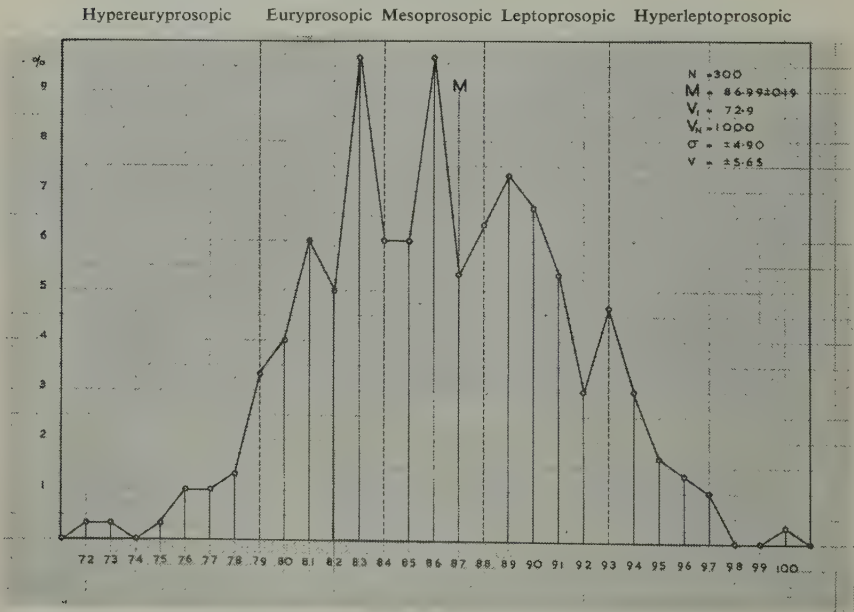


Table 40

M	m	ϵ	δ	w	v	V_l	V_n
86.99 \pm 0.19		4.04	4.90	4.77	5.65	72.9	100.0

The mean value is 86.99 ± 0.19 , the median and the mode 86, and the range 72.9 to 100.0 which represents a considerable degree of variability, a fact which is also reflected in the values of ϵ , δ and the coefficients of variation w and v (Tables 40 and 41 and Fig. 15).

Table 41

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
72	1	0.33	87	16	5.33
73	1	0.33	88	19	6.33
74			89	22	7.33
75	1	0.33	90	20	6.67
76	3	1.00	91	16	5.33
77	3	1.00	92	9	3.00
78	4	1.33	93	14	4.67
79	10	3.33	94	9	3.00
80	12	4.00	95	5	1.67
81	18	6.00	96	4	1.33
82	15	5.00	97	3	1.00
83	29	9.67	98		
84	18	6.00	99		
85	18	6.00	100	1	0.33
86	29	9.67			

Figure 15 is not a unimodal frequency curve and the three highest peaks are co-incident with the euryprosopic, the mesoprosopic and the leptoprosopic categories respectively. Classified into five categories according to Garson (Martin, 1928) as in Table 42, the students seem to be leptoprosopic with an incidence of 28.67%. However, the numeric difference between the mesoprosopic and either the euryprosopic or the leptoprosopic categories, is less than 2%; and the mean value falls just within the boundaries of the mesoprosopic category. It is thus safe to conclude that the student population from which the sample was drawn, is mesoprosopic with a definite tendency to the leptoprosopic condition. Van der Westhuysen (1929) came to the conclusion that his students were just within the leptoprosopic group.

Table 42

Category	Class boundaries	Frequency	
		absolute	%
Hypereuryprosopic ...	—78·9	13	4·33
Euryprosopic ...	79·0—83·9	84	28·00
Mesoprosopic ...	84·0—87·9	81	27·00
Leptoprosopic ...	88·0—92·9	86	28·67
Hyperleptoprosopic ...	93·0—	36	12·00

16 *Physiognomical upper facial height*

Figure 16

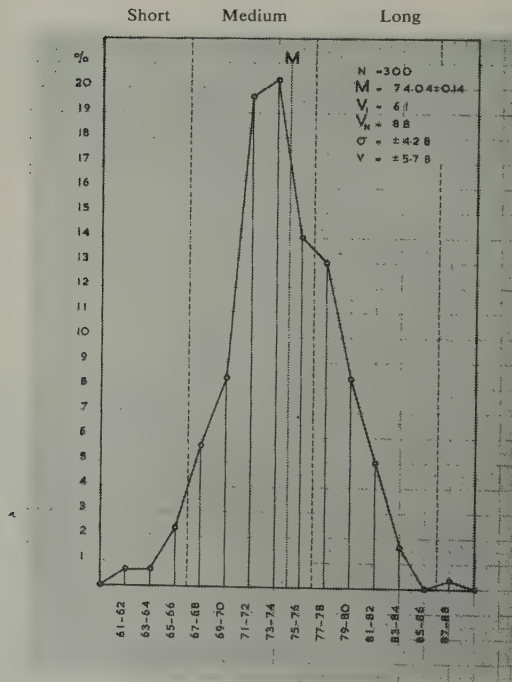


Table 43

M	m	ε	δ	w	v	V _l	V _n
74.04 ± 0.17		3.36	4.28	4.53	5.78	61	88

The mean value for the nasion-stomion distance is 74.04 ± 0.17 mm. within a range of 61 mm. to 88 mm. (Table 43 and Fig. 16). The median, the mode and the mean all have the same value, i.e. 74 mm.

Grouped at class intervals of 2 mm., it is found that the most frequently occurring group (73—74 mm.) include both the mean value and the median (Table 44).

Table 44

Class boundaries	Frequency		Class boundaries	Frequency	
	absolute	%		absolute	%
61—62	2	0.67	75—76	42	14.00
63—64	2	0.67	77—78	39	13.00
65—66	7	2.33	79—80	25	8.33
67—68	17	5.67	81—82	15	5.00
69—70	25	8.33	83—84	5	1.67
71—72	59	19.67	85—86		
73—74	61	20.33	87—88	1	0.33

In Table 45 the values obtained for the physiognomical upper facial height are classified into five categories. Where the morphological height of the face is regarded as medium with a tendency towards short-facedness (Table 32), the medium sized upper face, with incidence 68.00%, shows a tendency towards long-facedness (Table 45).

Table 45

Category	Class boundaries	Frequency	
		absolute	%
Very short	—56		
Short ...	57—66	11	3.67
Medium ...	67—76	204	68.00
Long ...	77—86	84	28.00
Very long	87—	1	0.33

17 Relative physiognomical upper facial height

The mean value for the relative physiognomical upper facial height is 4.18 ± 0.01 , the median and the mode 4.0 for a range of 3.4 to 4.9 (Tables 46 and 47 and Fig. 17).

Figure 17

Relative physiognomical upper facial height

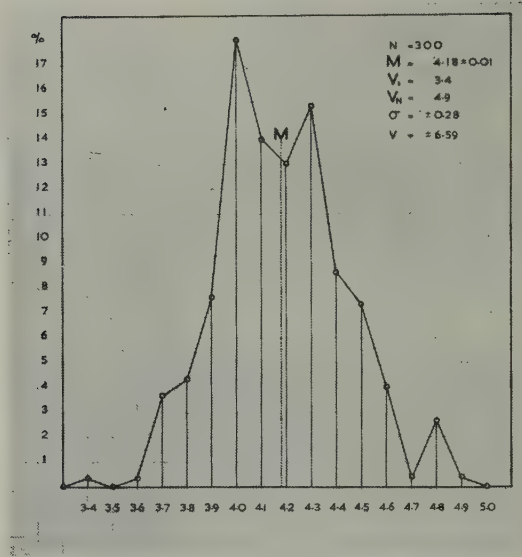


Table 46

M	m	ϵ	δ	w	v	V_l	V_n
4.18 ± 0.01		0.20	0.28	4.88	6.59	3.4	4.9

Table 47

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
3.4	1	0.33	4.2	39	13.00
3.5			4.3	46	15.33
3.6	1	0.33	4.4	26	8.67
3.7	11	3.67	4.5	22	7.33
3.8	13	4.33	4.6	12	4.00
3.9	24	7.67	4.7	1	0.33
4.0	54	18.00	4.8	8	2.67
4.1	42	14.00	4.9	1	0.33

18 *Physiognomical upper facial index*

Figure 18

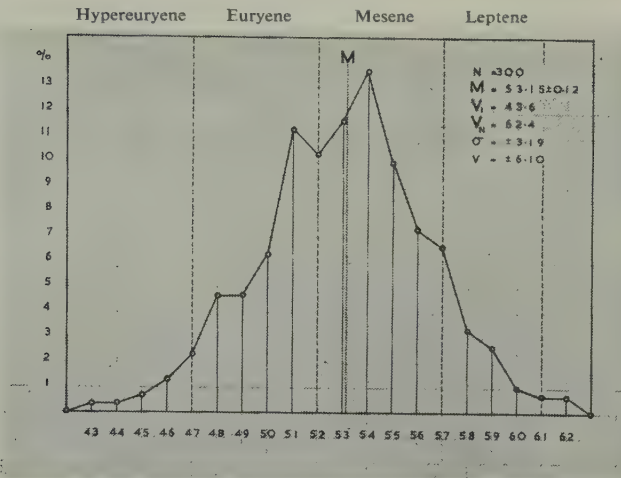


Table 48

M	m	ε	δ	w	v	V ₁	V _n
53.51 ± 0.12		2.50	3.19	4.67	6.10	43.6	62.4

The physiognomical upper facial height in terms of the maximum bitygomatic diameter has a mean value of 53.51 ± 0.12 , which lies midway between the mode (54) and the median (52) in a range from 43.6 to 62.4 (Tables 48 and 49 and Fig. 18).

Table 49

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
43	1	0.33	53	35	11.67
44	1	0.33	54	41	13.67
45	2	0.67	55	30	10.00
46	4	1.33	56	22	7.33
47	7	2.33	57	20	6.67
48	14	4.67	58	10	3.33
49	14	4.67	59	8	2.67
50	19	6.33	60	3	1.00
51	34	11.33	61	2	0.67
52	31	10.33	62	2	0.67

Table 50

Category	Class boundaries	Frequency	
		absolute	%
Hypereuryene	—46·9	8	2·67
Euryene... ..	47·0—51·9	88	29·33
Mesene	52·0—56·9	159	53·00
Leptene	57·0—60·9	41	13·67
Hyperleptene	61·0—	4	1·33

Classified into five groups according to Martin (1928), more than half (53·00%) of the 300 individuals are mesene, in which category also lies the mean value ($53·51 \pm 0·12$). The next largest group (29·33%) is the euryene group; there is thus a definite tendency towards the euryene condition. The total facial index indicates a mesoprosopic condition (medium-long face) with a tendency to a leptoprosopic condition (long-faced) as indicated by a mean value of $86·99 \pm 0·19$ (Table 40), which lies very near to the boundary between the mesoprosopic and leptoprosopic groups. This tendency is also indicated by a maximum incidence of the leptoprosopic group (Table 42). Although the physiognomical facial index is mesene, the upper face tends to become broad (Table 50).

19 Transverse cephalo-facial index

Figure 19

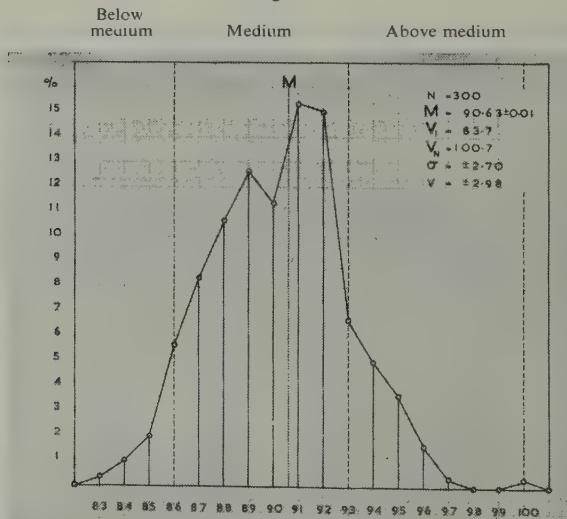


Table 51

M	m	ϵ	δ	w	v	V_I	V_n
90.63	0.01	2.19	2.70	2.41	2.98	83.7	100.7

The transverse cephalo-facial index expresses the relation between the maximum bizygomatic diameter and the breadth of the head, i.e. the bizygomatic diameter expressed as a percentage of the breadth of the head. The values vary from 83.7 to 100.7 with a mean value of 90.63 ± 0.01 (Table 51 and Fig. 19).

From a morphological point of view, the measurement is a very interesting one, since the face, seen in the norma facialis, presents cranial and facial characteristics of a fundamental kind. Next to the nasal, the facial characters, relative to the cranial ones, are the most characteristic of human features and they vary considerably among human races. The degree of prominence of the zygomatic bones that support the soft parts of the cheek, is directly responsible for the variability of this index. The index for Eskimoese, with exceptionally prominent cheekbones, was found by Boas (Schlaginhaufen, 1946) to be 102.7. This value indicates an excess of 2.7% of the maximum bizygomatic diameter over the maximum breadth of the head.

Table 52

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
83	1	0.33	92	45	15.00
84	3	1.00	93	20	6.67
85	6	2.00	94	15	5.00
86	17	5.67	95	11	3.67
87	25	8.33	96	5	1.67
88	32	10.67	97	1	0.33
89	38	12.67	98		
90	36	11.33	99		
91	46	15.33	100	1	0.33

From Table 52 it can be seen that the median and the mode have the same value, viz. 91, which is only slightly higher than the mean index value of 90.63 ± 0.01 . This mean value, being nearer to the upper boundary of the category "medium", indicates a tendency towards the category "above medium", a group with an incidence of 17.33% (Table 53).

Table 53

Category	Class boundaries	Frequency	
		absolute	%
Low	—78·9		
Below medium...	79·0—85·9	10	3·33
Medium	86·0—92·9	237	79·00
Above medium ...	93·0—99·9	52	17·33
High	100·0—	1	0·33

20 *Height of nose*

Figure 20

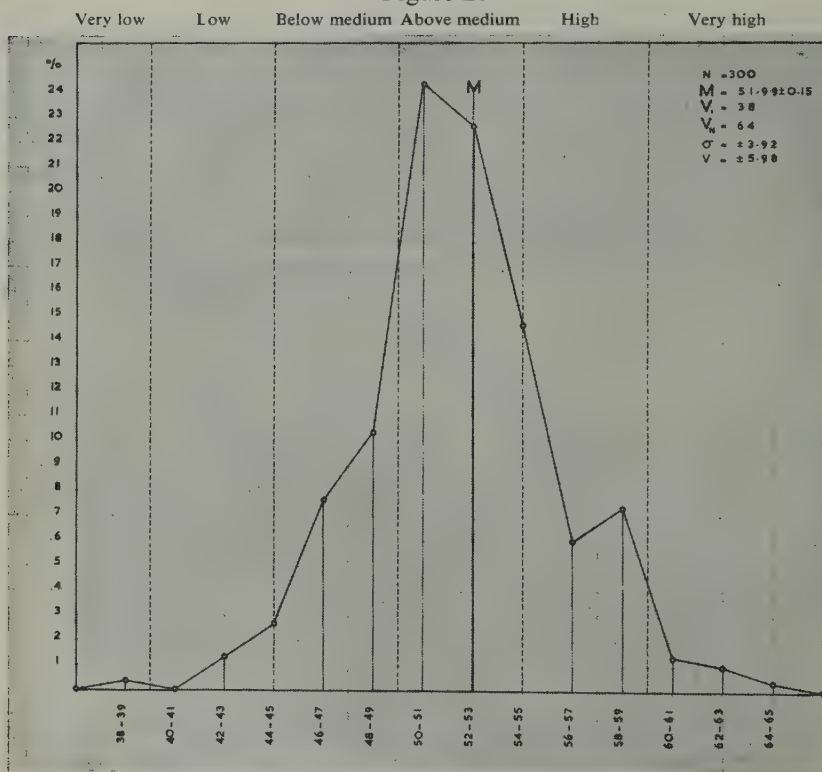


Table 54

M	m	ϵ	δ	w	v	V_l	V_n
51.99	0.15	2.99	3.92	5.75	5.98	38	64

The height of the nose (nasion-subnasale distance) is often erroneously referred to as the length of the nose. The values vary from 38 mm. to 64 mm., the mode as well as the median being 51 mm. The mean value is 51.99 ± 0.51 mm. (Table 54 and Fig. 20).

In Table 55 the values are recorded at class intervals of 1 mm. and in Table 56 at class intervals of 5 mm. The most frequently occurring values are those between the boundaries 50 mm. and 54 mm. with an equal incidence in the categories “below medium” and “high”.

Table 55

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
38	1	0.33	52	32	10.67
39			53	36	12.00
40			54	25	8.33
41			55	19	6.33
42	2	0.67	56	8	2.67
43	2	0.67	57	10	3.33
44	3	1.00	58	10	3.33
45	5	1.67	59	12	4.00
46	7	2.33	60	3	1.00
47	16	5.33	61	1	0.33
48	13	4.33	62	3	1.00
49	18	6.00	63		
50	33	11.00	64	1	0.33
51	40	13.33			

Table 56

Category	Class boundaries	Frequency	
		absolute	%
Very low	—39	1	0.33
Low	40—44	7	2.33
Below medium...	45—49	59	19.67
Above medium ...	50—54	166	55.33
High	55—59	59	19.67
Very high	60—	8	2.67

21 Width of nose

Figure 21

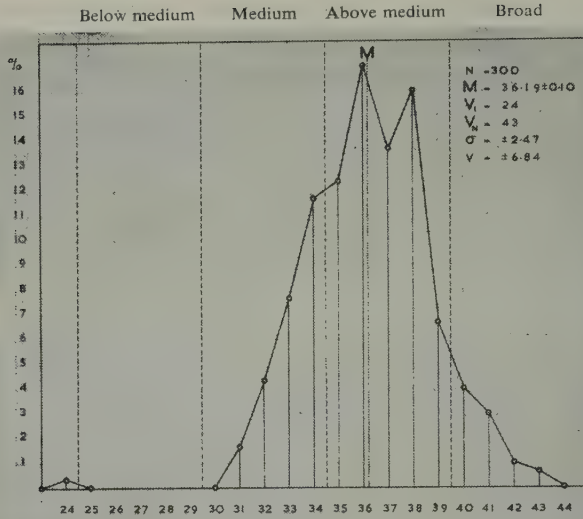


Table 57

M	m	ε	δ	w	v	V ₁	V _n
36.19 ± 0.10		1.90	2.47	5.26	6.84	24	43

The width of the nose is the distance between the alae nasi. The mean value is 36.19 ± 0.10 mm., the mode 36 mm., the median 33 mm., and the range from 24—43 mm. (Tables 57 and 58 and Fig. 21).

Table 58

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
24	1	0.33	34	35	11.67
25			35	37	12.33
26			36	51	17.00
27			37	41	13.67
28			38	48	16.00
29			39	20	6.67
30			40	12	4.00
31	5	1.67	41	9	3.00
32	13	4.33	42	3	1.00
33	23	7.67	43	2	0.67

Table 59

Category	Class boundaries	Frequency	
		absolute	%
Narrow	—24	1	0.33
Below medium...	25—29		
Medium	30—34	66	22.00
Above medium ...	35—39	207	69.00
Broad	40—	26	8.67

In Table 59 the values are classified into five categories at class intervals of 5 mm. Although the range is considerable, the great majority (69.00%) fall within the category "above medium".

22 Nasal Index

Figure 22

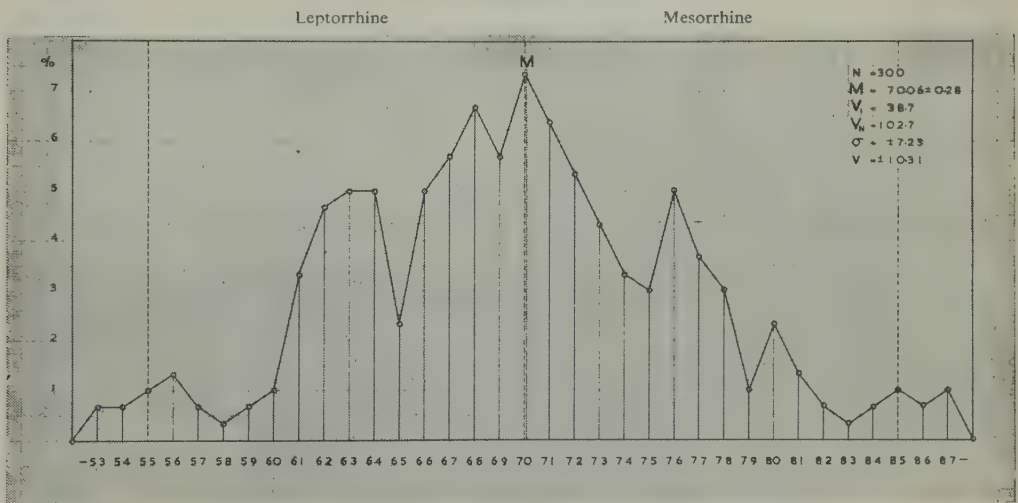


Table 60

M	m	ϵ	δ	w	v	V_1	V_n
70.06 ± 0.28	5.49	7.23	7.83	10.31	38.7	102.7	

This index, the width of the nose relative to its length, is always considered to be a significant racial character. It has been suggested by some anthropologists that the prevailing temperature of the respiratory air has an influence on the shape of the

nose, and this in turn is responsible for the variation of the index value in the races of mankind.

This index value of the students shows considerable variability: the range is from 38·7—102·7, the mean deviation (ϵ) is 5·49, the standard deviation (δ) is 7·23 and the coefficients of variation of these (ϵ and δ) are $w = 7·83$ and $v = 10·31$. The other statistical values are: mode = 70, median = 72 and the arithmetic mean $70·06 \pm 0·28$ (Tables 60 and 61 and Fig. 22).

Table 61

Class values	Frequency		Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%		absolute	%
53	2	0·67	67	17	5·67	81	4	1·33
54	2	0·67	68	20	6·67	82	2	0·67
55	3	1·00	69	17	5·67	83	1	0·33
56	4	1·33	70	22	7·33	84	2	0·67
57	2	0·67	71	19	6·33	85	3	1·00
58	1	0·33	72	16	5·33	86	2	0·67
59	2	0·67	73	13	4·33	87		
60	3	1·00	74	10	3·33	88		
61	10	3·33	75	9	3·00	89	1	0·33
62	14	4·67	76	15	5·00	90		
63	15	5·00	77	11	3·67	91	1	0·33
64	15	5·00	78	9	3·00	92		
65	7	2·33	79	3	1·00	102	1	0·33
66	15	5·00	80	7	2·33			

Van der Westhuysen (1929) records a mean value of 58·8, which places his students in the leptorrhine (narrow-nosed) group. In the present investigation only 14 (4·67%) of the 300 students have a nasal index value of less than 59. A mean value of $70·06 \pm 0·28$ places the students under consideration just within the mesorrhine group. However, an incidence of 48·33% for the leptorrhine group which is 0·66% higher than that for the mesorrhine group (47·67%) compels us to regard the students as leptorrhine to mesorrhine (Table 62).

Table 62

Category	Class boundaries	Frequency	
		absolute	%
Hyperleptorrhine ...	—54·9	4	1·33
Leptorrhine ...	55·0—69·9	145	48·33
Mesorrhine ...	70·0—84·9	143	47·67
Chamaerrhine ...	85·0—99·9	7	2·33
Hyperchamaerrhine ...	100·0—	1	0·33

In Table 63 are recorded the nasal index values for some of the European nationalities as well as the values for some of the Negroids.

Table 63

Nationality	Nasal index	Author
South Africans (students)	58·8	van der Westhuysen 1929
Germans (students) ...	62·91	Kretschmar 1932*
Swiss (recruits)	62·95	Schlaginhaufen 1946
Americans (students) ...	64·00	Gray and Ayres 1931*
Anglo-Scottish	65·1	Beddoe†
French	65·24	Collignon x
South Africans (students)	70·06	Author
South African Bastards ...	85·5	Fischer
Bushmen	102·5	Werner†
Australians	107·6	Collignon†

† Quoted by Martin (1928).
x Quoted by Schlaginhaufen (1946).
* Quoted by Krogman (1941).

23 Transverse nasio-facial index

Figure 23

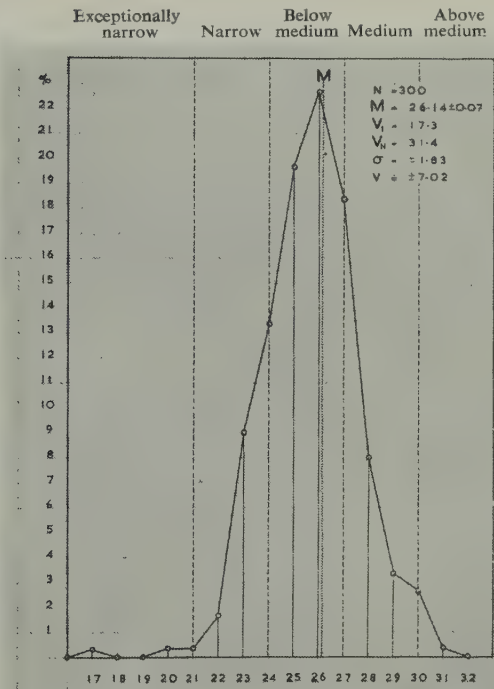


Table 64

M	m	ϵ	δ	w	v	V _l	V _n
26.14 \pm 0.07		1.42	1.83	5.43	7.02	17.3	31.4

The statistical characteristics for the relation between the width of the nose and the maximum bizygomatic diameter are: mean index value 26.14 ± 0.07 , range 17.3--31.4 with a median of 24 and a mode of 26 (Tables 64 and 65 and Fig. 23).

Table 65

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
17	1	0.33	25	59	19.67
18			26	68	22.67
19			27	55	18.33
20	1	0.33	28	24	8.00
21	1	0.33	29	10	3.33
22	5	1.67	30	8	2.67
23	27	9.00	31	1	0.33
24	40	13.33			

Schlaginhaufen (1946) divided the transverse nasio-facial index values into seven categories. When this classification is applied to the data of the present investigation, the category "below medium" has an incidence of 55.67% and the category "medium" an incidence of 29.67%.

Table 66

Category	Class boundaries	Frequency	
		absolute	%
Exceptionally narrow ...	—20.9	2	0.67
Narrow ...	21.0—23.9	33	11.00
Below medium ...	24.0—26.9	167	55.67
Medium ...	27.0—29.9	89	29.67
Above medium ...	30.0—32.9	9	3.00
Broad ...	33.0—35.9		
Exceptionally broad ...	36.0—		

24 Sagittal nasio-facial index

Figure 25

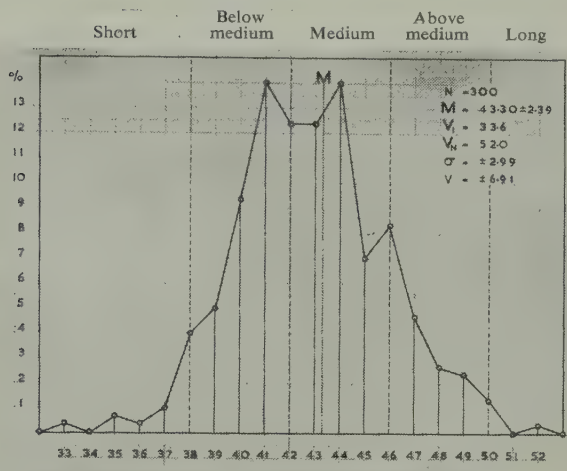


Table 67

M	m	ε	δ	w	v	V _l	V _n
43·30	± 0·12	2·39	2·99	5·52	6·91	33·6	52·0

The sagittal nasio-facial index expresses the height of the nose as a percentage of the morphological facial height (length). The index value varies from 33·6—52·0 about a mean value of 43·30 ± 0·12. The median and the mode have the same value, viz. 42 (Tables 67 and 68 and Figure 24). A mean value of 43·30 ± 0·12 indicates a nose of medium height with regard to the length of the face.

Table 68

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
33	1	0·33	43	37	12·33
34			44	42	14·00
35	2	0·67	45	21	7·00
36	1	0·33	46	25	8·33
37	3	1·00	47	14	4·67
38	12	4·00	48	8	2·67
39	15	5·00	49	7	2·33
40	28	9·33	50	4	1·33
41	42	14·00	51		
42	37	12·33	52	1	0·33

Schlaginhaufen (1946) divides the class values given in Table 68 into five categories. Divided thus, the most frequently occurring values, in descending order of magnitude, are those in the categories "medium", "below medium" and "above medium". The height of the nose comprised 42.0—45.9%, 38.0—41.9%, and 46.0—49.9% of the total length of the face respectively (Table 69).

Table 69

Category	Class boundaries	Frequency	
		absolute	%
Short	—37.9	7	2.33
Below medium... ..	38.0—41.9	97	32.33
Medium	42.0—45.9	137	45.67
Above medium	46.0—49.9	54	18.00
Long	50.0—	5	1.67

25 Nasal width-facial height index

Figure 25

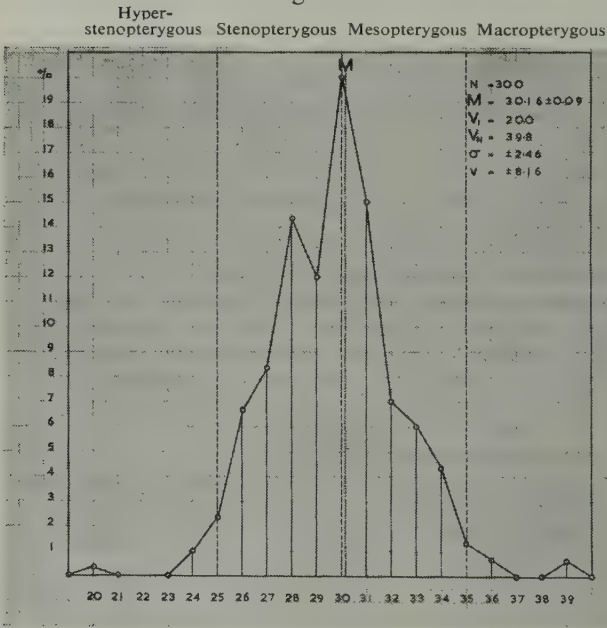


Table 70

M	m	ε	δ	w	v	V ₁	V _n
30.16 ± 0.09	1.93	2.46	6.39	8.16	20.0	39.8	

In 1906 Fritz Sarasin (Schlaginhaufen, 1946) suggested this index, which expresses the width of the nose as a percentage of the morphological facial height (length). The statistical characteristics of this index are as follows: mean value of index 30.16 ± 0.09 , range 20.0—39.8, median 29 and mode 30 (Tables 70 and 71 and Fig. 25).

Table 71

Class values	Frequency		Class values	Frequency	
	absolute	%		absolute	%
20	1	0.33	30	60	20.00
21			31	45	15.00
22			32	21	7.00
23			33	18	6.00
24	3	1.00	34	13	4.33
25	7	2.33	35	4	1.33
26	20	6.67	36	2	0.67
27	25	8.33	37		
28	43	14.33	38		
29	36	12.00	39	2	0.67

Plattner (Schlaginhaufen, 1946) divides the class values as recorded in Table 71 into five categories (Table 72). The two categories with the highest incidence are “mesopterygous” and “strenopterygous” indicating a nose that is medium-broad or narrow with respect to the length of the face.

Table 72

Category	Class boundaries	Frequency	
		absolute	%
Hyperstenopterygous ...	—24.9	4	1.33
Stenopterygous ...	25.0—29.9	131	43.67
Mesopterygous ...	30.0—34.9	157	52.33
Macropterygous ...	35.0—39.9	8	2.67
Hypermacropterygous	40.0—		

B NON-METRICAL CHARACTERS

1 Eye colour

The eye colour was determined by means of Martin’s “Augenfarbentafel.” The colours (Nos. 1—16) on the tablet are graded shades of brown, green and blue. To provide for colours that cannot be matched to any of Nos. 1—16, Martin (1928) recommends that whenever a colour is found to be a shade darker or lighter than the one nearest to it on the tablet, it should be indicated by a stroke above or below the

number of the latter, — below for a darker, above for a lighter shade. In this way no less than 63 eye colours can be recorded by using the following means of differentiation:

- No. $\bar{3}$ —a shade lighter than No. 3;
- No. 3 —the same colour as on the tablet;
- No. $\underline{3}$ —a shade darker than No. 3;
- No. $\bar{3}-4$ —a shade intermediate between Nos. 3 and 4;
- No. $\bar{4}$ —a shade lighter than No. 4, etc.

Notwithstanding these provisions, there yet remain certain types of eye colour that defy exact classification. Schlaginhaufen (1946) recognized four additional groups: Eyes presenting different shades of green other than those indicated by Nos. 7, 7—8, and 8 are not allowed for on the tablet. Such shades of green were frequently met with during this investigation and were described as “green” without reference to any number on the tablet.

The second group consists of those homogeneous colours that can only be described as the colour obtained by combining two or more of the colours within the same category. They are classified as “other colours” in Table 73.

To the third group belong colours obtained by combining two or more colours that are grouped under different categories, viz. brown (No. 1 to 6—7), intermediate (Nos. 7 to 12—13) and light (Nos. 13 to 16). Thus, a colour indicated by referring to Nos. 5 and 7 on the tablet, is classified as “other colours” since both colours fall within the boundaries of the category brown. However, a colour indicated by Nos. 5 and 8 represents a mixture of the categories brown and intermediate.

The fourth group are those colours which are not homogeneous in colour but in which two or more sectors in the iris are differently coloured. Such eyes are very rare and have not occurred in this investigation. One subject however, presented differently coloured eyes: the left eye was green (No. 8) and the right eye brown (No. 5). In Table 73 he is classified as different.

Table 73

No.	Frequency		No.	Frequency	
	absolute	%		absolute	%
3	7	2.33	11	3	1.00
3—4	5	1.67	11—12	9	3.00
4	22 (1+)	7.67	12	22 (1+, 1—)	8.00
4—5	20	6.67	12—13	5	1.67
5	22	7.33	13	13	4.33
5—6	3	1.00	13—14	6	2.00
6	5	1.67	14	11	3.67
6—7	1	0.33	14—15	2	0.67
7	18 (1+)	6.33	15	10 (2+)	4.00
7—8	7	2.33	15—16	9	3.00
8	14	4.67	16	14 (1+)	5.00
8—9	6	2.00	Green	14	4.67
9			Other colours	9	3.00
9—10	1	0.33	Mixed	7	2.33
10	14	4.67	Different	1	0.33
10—11	13	4.33			

The variation breadth of eye colour of 300 students is considerable, extending from No. 3 to No. 16 (Table 73). The number(s) in brackets followed by $++$ or $-$ indicates the number of individuals where the eye colour was a shade darker ($++$) or a shade lighter ($-$) than that nearest on the tablet.

The colour with the highest incidence is No. 12. This colour is called "light gray" by Grobbelaar (1952). I prefer to call it greenish-blue: the iris has a light blue background, the green effect being produced by a thin layer of anterior yellow pigment over the blue posterior background. The five shades with the highest incidence, in descending order of magnitude, are: No. 12, a greenish-blue (8.00%); No. 4, a brown colour (7.67%); No. 5, a lighter brown (7.33%); No. 4—5, a shade intermediate between brown and light brown (6.67%); and No. 7, a greenish colour (6.33%).

In Table 74 the eye colours of Table 73 are classified in three main categories: brown, intermediate and light and the four additional groups described above.

Table 74

Category	Frequency	
	absolute	%
Martin 1 to 6—7 ...	86	28.67
Martin 7 to 12—13...	115	28.33
Martin 13 to 16 ...	68	22.67
Green ...	14	4.67
Other colours ...	9	3.00
Mixed ...	7	2.33
Different ...	1	0.33

The number of categories in Table 74 can be reduced to 4, namely brown, intermediate and light as in Table 75:

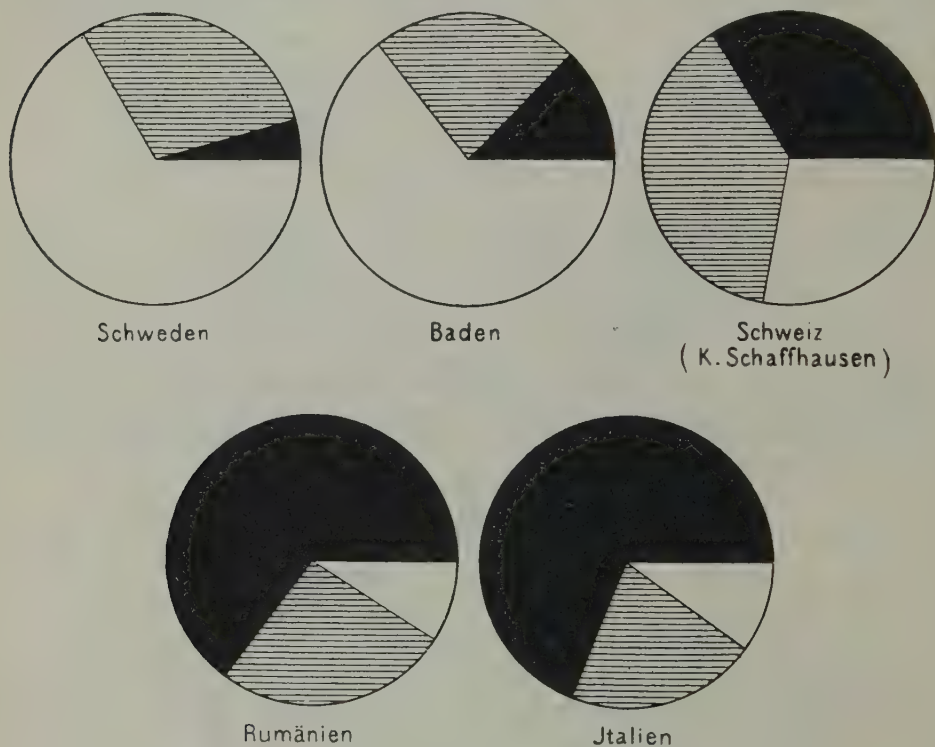
Table 75

Category	Frequency	
	absolute	%
Brown ...	88	29.33
Intermediate...	140	46.67
Light ...	71	23.67
Different ...	1	0.33

It is customary for Schlaginhaufen (1946) to include the last four groups of Table 74 in the category "intermediate" (Table 75), since in his material most of these colours fall within the category "intermediate". I also classify the "green" and "mixed" as intermediate. The group "different", containing only one individual, was not taken into consideration, since it would in any case not change the percentage frequency. The "other colours" were such that two definitely belonged to the category brown, four to the category "intermediate", and three to the category "light". The percentage

frequencies obtained by following Schlaginhaufen's example will differ only very slightly (from 0.67% to 1.33% depending on the number of individuals under consideration) from that obtained by assigning "other colours" to each of the three categories "brown", "intermediate" and "light". The percentage frequencies in Table 75 can therefore confidently be used for purposes of comparison with the values obtained by Schlaginhaufen (1946). In Figure 26 the eye colour sectograms of the Swedes, Bavarians, Swiss, Rumanians and Italians (Martin, 1928) are compared with those of the Swiss recruits of Schlaginhaufen (1946) and with those of the South African students (Fig. 27). The Swedes and Bavarians are blue-eyed, the Rumanians and Italians dark-eyed, and the eye colour of the South African students and the Swiss fall between these two groups.

Figure 26

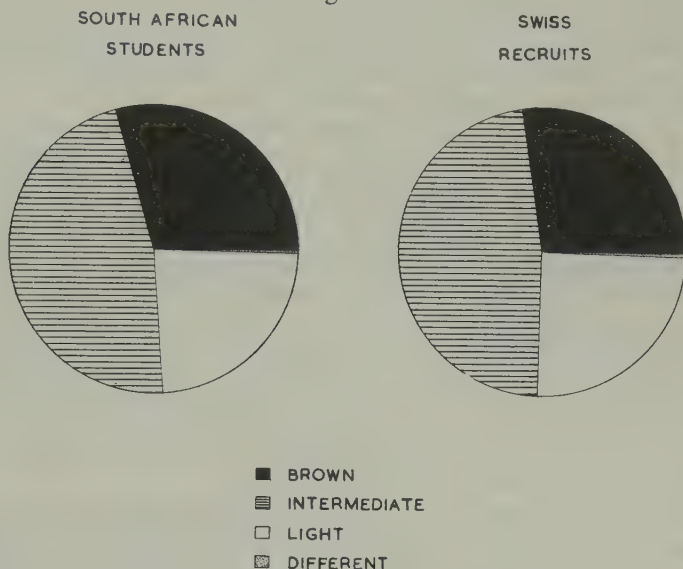


The investigation of the eye colour included observations on the distribution and colour of the pigment in the anterior surface of the iris. A brief description, however, of the structure of the iris and the distribution of its pigmented cells, will facilitate the evaluation of the results obtained.

The iris is a thin, circular, contractile disc, perforated, slightly towards the nasal side of its centre, by the circular aperture of the pupil. It consists of four layers, the outermost of which is composed of a layer of flattened endothelial cells, heavily pigmented in Negroes; and in Europeans with dark-coloured irides it contains some

pigment granules. The second layer, the stroma, is a fibrous connective tissue, its cells containing pigment in dark-eyed individuals. The stroma is followed by a layer of circular and radiating muscle fibres. The innermost layer consists of two layers of pigmented epithelial cells of a deep purple tint.

Figure 27



The variability of the eye colour in man is due partly to the absence or presence of the different pigments in the different layers of the iris and to actual differences in the structure of the iris itself, and the size and density of the pigment granules. The anterior pigment of the iris may be yellow and/or brown. Some have claimed that these are two different pigments, but Gates (1949) maintains that this anterior pigment is melanin and the shades from a deep brown to a pale yellow are the result of dilution of this single pigment. In the albino the iris lacks pigment, and the bright red blood appears pink through the superficial fibrous tissues.

According to Ziegelmayer (1954) both colour and structure of the iris vary according to sex, the difference being more marked in the adult than in the child.

When the upper layers of the iris contain no pigment the dark pigment of the posterior layer appears blue through the overlying layers. This is the case in pure blue eyes, the different shades of blue being chiefly due to the structure, texture and colour of the overlying fibrous layers.

"Gray", green and brown eyes and the darker and lighter shades of each colour, are due to the presence, localisation, quality and amount of the yellow and brown pigment in the middle and anterior layers of the iris.

Those shades indicated by Nos. 9 to 12 are often called "gray". This so-called gray effect is produced by a thin superficial layer of yellow pigment blending with the blue background and should preferably be described as greenish blue.

When the upper layers are more heavily pigmented, the retinal or posterior pigment is obscured and the eyes are brown, dark brown or even yellowish brown if

the anterior pigment is yellow and brown. If the yellow anterior pigment has the same density as the blue back-ground, green eyes are the result. The so-called black eyes are actually intensely dark brown to such a degree that the dark pupil cannot be distinguished from the iris.

Round the periphery of the iris, the anterior pigment is often absent and the dark posterior pigment is seen as a dark ring, particularly in the case of those eyes belonging to the category "intermediate".

In studying the eye colour and distribution of the eye pigment of 237 male students, observations were confined to the nature and distribution of the anterior pigment (if present), and characteristics of the dark ring (if present).

Hurst (1908) coined the terms "simplex" to denote the absence of anterior pigment and "duplex" (self-coloured duplex, ringed duplex and spotted duplex) for its presence. From the standpoint of pigment distribution, Hooton (1946) recognizes two categories of eyes: those with primary (posterior) pigment only, corresponding to Hurst's (1908) "simplex" type, and those with primary and secondary pigment which Hurst (1908) called the "duplex" type. The latter category is subdivided into "pale mixed", "mixed" and "dark eyes". I, however, restricted myself to these two main divisions without taking account of the subdivisions which are always difficult to determine on account of the amount of overlapping. It should here be noted that even the two main categories cannot always be clearly distinguished from each other: many eyes appear to lack anterior pigment and only a close examination in a good light reveals a very fine discontinuous layer of anterior pigment. About one half of the eyes that appeared to have no anterior pigment, actually had anterior pigment which was discovered by a closer examination in a good light.

Of the 237 students only 11 (4.6%) have eyes without anterior pigment, and a dark ring round the periphery of the iris is found in only 0.8%. To this category belong the lighter shades of blue, i.e. Nos. 14, 15 and 16. The remaining 226 (95.4%) have posterior pigment in combination with anterior pigment in various degrees of concentration.

In 124 (54.9%) of the 226 subjects the anterior pigment was yellow. Yellow pigment is mostly seen in the intermediate and light eye colours, but is also found, less frequently however, in brown eyes. Individuals with brown pigment only are much less common: only 52 (23.0%) have brown anterior pigment. Occasionally in blue eyes, brown pigment is seen as small isolated patches, scattered over the whole front of the iris. In 50 (22.1%) of the 226 subjects the upper layer contains yellow and brown pigment. These two pigments are very common in eye colours Nos. 4 and 5, and eyes with isolated patches of brown and yellow anterior pigment are not uncommon in the categories "intermediate" and "light".

In approximately one third (30.5%) of the 226 subjects there is a dark ring of posterior pigment around the periphery of the iris, whereas in two thirds (69.5%) it is absent altogether. Of the former (69 or 30.5%) with a dark ring, 40.6% shows an even distribution of the anterior pigment over the entire iris up to the inner edge of the black ring round the periphery; in 34.8% the anterior pigment is confined to a circular area round the pupil; in 14.5% it is present either as isolated patches or as rays or striations radiating outwards from the pupil; in 5.8% coloured isolated patches are gathered around the pupil or they are superimposed over a lighter uniformly distributed layer of anterior pigment. The remainder (4.3%) have eyes in which the anterior pigment is confined to an area between the edge of the pupil and the inner edge of the peripheral ring.

In 157 (69·5%) of the 226 subjects, there is no indication of a dark ring. In 43·9% of these the anterior pigment is confined to an area round the pupil. This is usually seen in "intermediate" and "light" eyes, but is not uncommon in brown eyes. In 31·0% the anterior pigment is more or less uniformly distributed over the whole front of the iris, in 16·1% it is present as isolated patches only, either around the pupil or over the entire surface of the iris; in 3·9% it is present as rays radiating from the pupil; and in 2·6% it is a uniformly coloured diffuse layer with darker overlying patches. The remainder (2·5%) present a variety of patterns of pigment concentration: a concentration of pigment around the pupil and around the inner edge of the periphery, the latter as a continuous circle, or as scattered patches, or as rays running from the pigment around the pupil to the periphery, or rays with superimposed coloured patches.

From the above it seems as if the anterior pigment tends to be evenly distributed over the whole front of the iris (40·6%) rather than to be concentrated around the pupil (34·8%) in those eyes which show a dark ring round the periphery of the iris. On the other hand, in those eyes without a dark ring, the anterior pigment seems to be concentrated round the pupil (43·9%) rather than being evenly distributed (31·0%). Taken as a whole, however, the anterior pigment shows a tendency to be concentrated around the pupil (40·7%), to be more or less uniformly diffused (33·6%), or to occur as isolated patches or radiating rays (18·1%). The remainder (7·6%) may show a concentration practically anywhere on the iris.

2 Hair colour

The colour of the hair was determined by means of Fischer's "Haarfarbentafel". According to Schlaginhaufen (1946) the 30 different colours of this tablet can be classified as: light blond (Nos. 12 to 22—23), blond (Nos. 23 to 26, 8—9), dark blond (No. 8), brown (Nos. 5 to 7—8), black-brown (Nos. 4, 4—5, 26—27 to 30) and red (Nos. 1 to 3, 9 to 11—12). Martin (1928) and others include Nos. 9 to 11—12 in the category blond, but Schlaginhaufen (1946) classifies this reddish blond hair as "red".

Table 76

No.	Frequency		No.	Frequency		No.	Frequency	
	absolute	%		absolute	%		absolute	%
2	1	0·33	10	4	1·33	29	9	3·00
2—3	1	0·33	10—11	2	0·67	30	20	6·67
3	1	0·33	11	2	0·67	2+7	1	0·33
4	64	21·33	11—12	2	0·67	3+6	1	0·33
4—5	3	1·00	14	1	0·33	7+9	1	0·33
5	53	17·67	22	1	0·33	4+6	2	0·67
5—6	5	1·67	23	1	0·33	5+30	1	0·33
6	3	1·00	24	3	1·00	6+29	2	0·67
6—7	4	1·33	25	6	2·00	4+27	1	0·33
7	26	8·67	25—26	4	1·33	5+7	2	0·67
7—8	2	0·67	26	6	2·00	3+9	1	0·33
8	20	6·67	27—	10	3·33	3 and 8	1	0·33
8—9	7	2·33	27	2	0·67			
9	2	0·67	29	22	7·33			

The colours with the highest incidence in Table 76 are the following:

<i>No.</i>	<i>Description of colour</i>	<i>Incidence (%)</i>
4	very dark brown	21·33
5	dark brown	17·67
7	light brown	8·67
29	slaty brown	7·33
8	dark blond	6·67
30	slaty dark brown	6·67

Although the students are dark-haired, a practical absence of black hair (No. 27) is conspicuous: only two subjects (0·67%) have black hair. Most of the hair described as "black" is not black, but a very dark brown approaching black, which is not allowed for on the tablet. When it is seen in transmitted light a distinct tint of brown or red is present. Such hair has been recorded as No. 27— in Table 76.

In Table 77 the colours of Table 76 are classified into eight categories, the last two of which are described as "mixed" and "two colours". Occasionally a colour cannot be matched with any of two colours in the series 1—30. When a colour identified in this way, represents a mixture of two of the categories (Table 77) it was classified as "mixed", e.g. a colour identified by matching it with Nos. 5 and 30 represents a mixture of the categories "brown" and "black-brown". However, if a colour is described as a combination of two colours within the boundaries of a category, e.g. Nos. 4 and 27, it is classified as "black-brown". Only when the colour of the hair on one part of the scalp is different from that on another, is it placed in the category "two colours" and both colours are recorded, e.g. Nos. 3 and 8.

Table 77

Category	No. (Fischer)	Frequency	
		absolute	%
Light blond ...	12 to 22—23 ...	2	0·67
Blond ...	23 to 26, 8—9 ...	27	9·00
Dark blond ...	8 ...	20	6·67
Brown ...	5 to 7—8 ...	95	31·67
Black brown...	4, 4—5, 26—27 to 30...	131	43·67
Red ...	1 to 3, 9 to 11—12 ...	16	5·33
Mixed ...	...	8	2·67
Two colours..	...	1	0·33

Among the South African students black-brown hair (43·67%) and brown hair (31·67%) predominate, light blond hair (0·67%) is rare, while an incidence of 5·33% for red hair is significant. This high value is accounted for by the fact that Nos. 9 to 11—12 are included in the category "red". It is customary for all anthropologists to follow Martin (1928) and to regard only Nos. 1—3 as red. Beddoe (Martin, 1928) finds an incidence of 5·3% for red hair in Scotland—the highest known frequency of red hair. This value would probably be much higher if Nos. 9 to 11—12 were included. According to Bolk (1907) the incidence for the Netherlands is 2·5%. Van der Westhuysen (1929) records no red-haired individuals in his material. According to

Grobbelaar (1952) the incidence of red hair for the South African students is 2.1%. Had he included Nos. 9 to 11—12 in the category “red” it would have raised the 2.1% to 6.3%. It is therefore safe to conclude that 5.3% to 6.3% of the South African students are red-haired when not only Nos. 1—3, but also Nos. 9 to 11—12, are counted as red.

In Table 78 the eight categories of Table 77 are reduced to four and the values compared with those of Schlaginhaufen (1946) and Grobbelaar (1952); the latter's classification is somewhat altered in order to make reliable comparisons.

Table 78

Category	Frequency		Grobbelaar (1952)	Schlaginhaufen (1946)
	absolute	%		
Blond	49	16.33	14.1	30.64
Brown and black-brown ...	231	77.00	79.4	63.32
Red	16	5.33	6.3	2.82
Mixed and two colours ...	4	1.33	—	3.22

Shades of brown that are classified as “mixed” in Table 77 are classified as “brown and black-brown” in Table 78; only those colours intermediate between red and brown or blond are classified as mixed in Table 78.

Another very interesting feature is the reddish tint of the hair. This tint is more common in the axillary and the pubic hair than in that of the scalp. Grobbelaar (1952) finds an incidence of 33.9% of red hair in the arm pits. This reddish tint is only occasionally mentioned by anthropologists such as Fischer (1913) for the Rehoboth Bastards, Martin (1928) for Bavarian children, van der Westhuysen (1929) for South African students and Niggli-Hürlimann (1930) for Swiss children.

It is now generally accepted that there are two distinct series of hair colour: a red and a brown series and one in which the red and brown are mixed. There is no difference between light blond and jet black hair; the latter is caused by an increase in the quality and quantity of the pigment, says Bolk (1907). Gardner and MacAdam (Hooton, 1946) using a Hardy spectrophotometer, analysed a series of hair samples, ranging from light blond to black, including a wide selection of reds. In some samples of black hair the hair contained a red pigment, which was masked by the black. This red pigment is clearly seen when the hair is bleached with peroxide. According to Scheinfeld (1939) red hair is due to a supplementary gene which produces a diffuse red pigment. If the melanin gene is very active, the hair can be dark brown, the effect of the red gene being completely obscured. Sometimes, however, the presence of this red gene is betrayed by a glossiness of the hair. According to Hooton (1946) it seems probable that red-haired individuals often result from the crossing of a black-haired parent in whom there is a recessive gene for the red pigment, with a blond mate in whose hair there is little pigment of any kind, and some of that little, the red-gold pigment.

Hauschild (1926, p. 95) ascribes the frequent occurrence of red hair to the loss

of a colour factor and explains the occurrence of red hair and the reddish tint or lustre in brown hair genetically as follows:

“Nimmt man zwei Farbfaktoren für das haar an, so würden die Erbformeln lauten: R = rot, M = braun, m, r = Fehlen vor rot bzw. braun.

RRMM = rotbraunes (kastanienbraunes) Haar,

RrMM = braunes Haar (mit rötlichem Schimmer),

rrMM = braunes Haar,

RRMm = rotblondes Haar,

RRmm = rotes Haar,

rrmm = farbloses Haar”.

The hair around the genitalia was also observed. The results are recorded in Table 79.

Table 79

No.	Frequency		No.	Frequency		No.	Frequency	
	absolute	%		absolute	%		absolute	%
2	3	1.00	7	24	8.00	29+	5	1.67
2—3	1	0.33	7—8	3	1.00	30	5	1.67
3	4	1.33	8	26	8.67	4+6	6	2.00
4	29	9.67	8—9	5	1.67	6+8	1	0.33
4—5	3	1.00	9	3	1.00	6+29	11	3.67
5	28	9.33	26	2	0.67	4+27	2	0.67
5—6	29	9.67	27—	2	0.67	4+29	1	0.33
6	73	24.33	27	1	0.33	3+9	4	1.33
6—7	19	6.33	29	9	3.00	3 and 7	1	0.33

The reddish tint already mentioned is characteristic of dark or light brown hair surrounding the genitalia. In some cases this reddish lustre is more pronounced than in others: in approximately one quarter (24.33%) the colour corresponds to No. 6, which is dark brown with a very definite reddish tint. The brown colour with less pronounced reddish lustre is distributed as follows: No. 6 in combination with No. 5 (9.67%), No. 7 (6.33%), No. 4 (2.00%), No. 8 (0.33%) and No. 29 (3.67%). In 46.33% therefore, the reddish lustre is present to a greater or less degree.

Table 80

Category	Nos. (Fischer)	Frequency	
		absolute	%
Light blond ...	12 to 22—23 ...	—	—
Blond ...	23 to 26, 8—9 ...	7	2.33
Dark blond ...	8 ...	26	8.67
Brown ...	5 to 7—8 ...	176	58.67
Black-brown...	4, 4—5, 26—27 to 30...	57	19.00
Red ...	1 to 3, 9 to 11—12 ...	15	5.00
Mixed ...		18	6.00
Two colours...		1	0.33

In the case of the hair on the scalp, the dominant colour is "black-brown" (Table 79), while, on the other hand, the genital hair is lighter (Table 80). Grobbelaar (1952) comes to the same conclusion. He includes No. 8 in the category "brown" and finds an incidence of 85.7% for brown hair, which is practically the same result as mine (86.34%).

In a small percentage of cases the pigmentation of the hair on the lower and lateral aspects of the scrotum is lighter than that above the root of the penis, as was also found by Grobbelaar (1952).

3 Skin Colour

The colour of the skin was determined with von Luschan's "Hautfarbentafel" in two regions: the untanned colour in the inguinal region of the abdomen and the colour of the areola. The values for 237 students are recorded in Table 81.

Table 81

No.	Frequency		No.	Frequency	
	absolute	%		absolute	%
3	1	0.42	14	32	13.50
8	53	22.37	14—15	12	4.86
11	64	27.01	15	16	6.76
11—12	6	2.43	15—16	1	0.42
12	8	3.38	16	2	0.84
12—13	2	0.84	16—17	1	0.42
13	29	12.24	17	2	0.84
13—14	5	2.11	Different	3	1.26

The predominating colours are, in diminishing order of frequency: No. 11, a carmine white (27.01%), No. 8, an off white (22.37%), and Nos. 14 (13.50%) and 13 (12.24%), darker shades of carmine white. Nos. 3 and 8 are off white colours with a ruddy appearance caused by the colour of the blood as seen through the overlying upper layers or dermis of the skin. This type of skin is usually correlated with red hair or brown hair with a reddish tint. It is this type of skin that reacts to, and at the same time protects itself against strong daylight, especially sunlight, by the formation of freckles. Such freckling is usually confined to certain areas, and invariably occurs in individuals with light brown eyes (No. 5) and with the skin and hair colour described above.

From Nos. 11 to 18 the skin colour increases in intensity and in skins with corresponding colours the colour of the blood becomes more and more suppressed. This type of skin is usually correlated with dark brown and the darker shades of blond hair in which a reddish tint is absent or hardly perceptible. It is also very interesting to find that this type of skin, i.e. a fairly dark skin, correlates with blue or "grey" eyes. Blue-eyed or "grey"-eyed individuals with dark blond or light brown hair generally "tan" very easily, while the opposite is true of blond, brown-eyed and red-haired individuals.

The three individuals under the group "different" in Table 83 were remarkable in that the skin pigment was not uniformly distributed but appeared as darker patches on a lighter background.

It is often difficult to discriminate between Nos. 8 and 11, a fact which may be responsible for the different values of Grobbelaar (1952) in the colours “off white” and “carmine white” (Table 82).

Table 82

Colour	Author	Grobbelaar (1952)
	%	%
Off white (3, 7, 8)	22·8	14·2
Carmine white (9—13)	48·0	64·8
Dark carmine white (beige) (14—18)	28·9	29·0

The colour of the areola varies from a ruddy carmine white to a dark brown. In many individuals with a light skin colour, the areola is highly vascularised and consequently has a distinct light red colour that cannot be matched to any of those on the tablet. By pressing the areola lightly with the ball of the thumb so as to drain the blood out of the superficial capillaries and releasing the pressure after five or six seconds the true colour could be estimated in the usual way. The values are recorded in Table 83. The numbers in brackets are those that show the light red colour as described above.

Table 83

No.	Frequency		No.	Frequency	
	absolute	%		absolute	%
11	(1)	0·42	23	62 (1)	26·59
14	(5)	2·11	23—24	3	1·27
15	(7)	2·95	24	25	10·55
17	(3)	1·27	24—25	4	1·69
18	17 (10)	11·39	25	27	11·39
19	(1)	0·42	25—26	6	2·53
22	38 (1)	16·46	26	15	6·33
22—23	7	2·95	27	4	1·69

In Table 84 the values in Table 83 are grouped together into four groups and compared with those of Grobbelaar (1952).

Table 84

Colour *	Author	Grobbelaar (1952)
	%	%
Carmine white (9—13)	0·4	1·5
Dark carmine white (beige) (14—18)	18·1	14·5
Bright brown	73·4	73·5
Dark to purplish brown (26—29) ...	8·0	10·7

4 Hair form

Three main categories of hair form are used in a primary classification of the human races. The two extreme types are coarse, straight hair and short, matted hair, variously named "woolly", "kinky" or "frizzy" hair. The straight and/or wavy hair of the Europeans occupies an intermediate position. Examples of the two extreme categories are exceptional among Europeans. Saller (1926) recognized 11 sub-groups as gradations of the three main types. His classification is: (a) stiff, (b) straight, (c) waves flat, (d) waves broad, (e) waves narrow, (f) locky, (g) curly, (h) curls loose, (j) curls thick, (k) fil-fil, and (l) spiral.

Table 85

Hair form	Frequency	
	absolute	%
Straight	144	60·77
Waves flat	58	24·48
Waves broad	26	10·97
Waves narrow	8	3·38
Curly	1	0·42

In the majority (60·77%) of the 237 students the hair was straight (Table 85). Only one individual had curly hair of the spiral type, the curls being large and loose.

5 Profile of the nose

Anthropologically, the shape of the nose is more important than its absolute or relative dimensions. The profile of the nose varies from convex to straight and from straight to concave. Noses with an even, concave contour and an even, convex contour are classified as concave and convex respectively. Noses with an uneven, convex or concave contour are described as "wavy" in Table 86.

Table 86

Characteristic form	Frequency	
	absolute	%
Straight	95	40·09
Concave	75	31·65
Convex	10	4·22
Wavy... ..	57	24·05

6 Profile of the occiput

The profile of the occiput can be described as flat, arched, or prominent. In Table 87 the frequencies of each category are compared with those of the male popula-

tion of Untertoggenburg, canton St. Gallen (Switzerland) as recorded by Büchi (1942) merely to show the great difference in percentage of "flat" profile.

Table 87

Characteristic form	Frequency		Swiss (Büchi)
	absolute	%	
Flat	19	8.02	38.6
Arched	112	47.26	55.5
Prominent	106	44.73	5.9

7 *Epicanthus*

Of the 237 subjects 32.7% have an epicanthic fold, a value which compares favourably with 33.8% recorded by van der Westhuysen (1929). A complete inner epicanthus or "Mongoloid-fold" was found in only two subjects. A few subjects had some indication of an inner epicanthus, but it was never so well pronounced as to cover the caruncula lachrymalis. The percentage of epicanthus for South African children will probably be much higher, since this character of the eyelids tends to disappear with advancing age.

8 *Supernumerary mammae*

Supernumerary mammae are found above and below the fully developed nipple in an imaginary line that represents the position of the embryonic milk-ridge which extends obliquely from the axilla to the inguinal region. According to Martin (1928) such mammae are more common among females, especially Europeans and Japanese. Of the 237 subjects 17 have supernumerary mammae; of these, three have one on either side of the body, situated between the normal nipple and the navel; of the remaining 14, 10 have the mamma on the left side disposed in a similar manner and in only one case is it situated between the normal nipple and the axilla. Only three subjects have a mamma on the right side of the body, in one of which it is situated between the nipple and the axilla. In the majority of cases these mammae are located on the left side of the body, where, according to recorded cases, they are usually found. No subjects were found with supernumerary mammae below the level of the navel.

9 *Abnormalities of the limbs*

During the investigation three cases of syndactyly were recorded. In one individual toes II and III are webbed in both feet, while in the second case the webbing occurs in the right foot only. The third individual shows syndactyly as well as polydactyly, both associated with other abnormalities. Both feet have six toes, with the second toe of each foot duplicated, hereinafter referred to as toes IIa and IIb. An X-ray photograph shows a forked metatarsal with a fully developed toe to each prong. Toes I, IIa, IIb, and III are webbed or grown together without any lateral synostosis of the

bones. Both hands originally had six fingers, with the little fingers (V) duplicated. On the right fingers III and IV were basally connected for half their length, while the same fingers on the left hand were completely webbed. Both the additional little fingers and the webs were surgically removed a few months after birth. The fingers and the toes show a peculiar flattening of the nails. According to Gates (1946) syndactyly is often associated with polydactyly, a single gene apparently accounting for both conditions.

In one subject the upper part of the pectoralis major on the left side is very feebly developed. This condition also affected the other muscles of the arm: the left deltoid muscle is inserted lower down on the humerus than in normal cases, while the right trapezius muscle reaches lower down on the back, with the result that the right shoulder is markedly lower than the left one. The maximum circumference of the upper right arm is 2.5 cm. less than that of the left, while the maximum circumference of the latter, when flexed, is 2.0 cm. less than that of the right one. The maximum circumference of the lower arms also differs: that of the left one being 0.9 cm. smaller.

C COMBINATION OF CHARACTERS

(a) Two character combinations

For the 2-character combinations the following measurements, indices and non-metrical characters were selected: stature, index cephalicus, morphological facial index, nasal index, eye colour, hair colour, hair form, profile of the nose and profile of the occiput. From these, the frequency of each of 17 such combinations was determined. In Tables 86 to 102 the absolute and percentage frequencies are given.

1 Stature and index cephalicus

Table 88

Index cephalicus		Hyper-dolichocephalic	Dolichocephalic	Mesocephalic	Brachycephalic	Hyper-brachycephalic	Total
Stature	Tall	2	82	138	35	8	256
	Medium	—	5	18	8	3	34
	Small	—	1	—	—	—	1
	Total	2	88	156	43	11	300
Stature	Tall	0.67	27.33	46.00	11.67	2.67	88.34
	Medium	—	1.67	6.00	2.67	1.00	11.34
	Small	—	0.33	—	—	—	0.33
	Total	0.67	29.33	52.00	14.34	—	100.01

The great majority, approximately one half (46·00%), are tall and mesocephalic. The group with the second highest incidence is tall and dolichocephalic (27·33%).

2 Stature and morphological facial index

Table 89

Morphological facial index		Hyper-eury-prosopic	Eury-prosopic	Meso-prosopic	Lepto-prosopic	Hyper-lepto-prosopic	Total
Stature	Tall	10	73	72	78	32	265
	Medium	3	11	9	7	4	34
	Small	—	—	—	1	—	1
	Total ...	13	84	81	86	36	300
Stature	Tall	3·33	24·33	24·00	26·00	10·67	88·33
	Medium	1·00	3·67	3·00	2·33	1·33	11·33
	Small	—	—	—	0·33	1·00	0·33
	Total ...	4·33	28·00	27·00	28·66	12·00	99·99

The combinations with the highest incidence in descending order of magnitude, are: 1 Tall/leptoprosopic 26·00%, 2 Tall/euryprosopic 24·33%, 3 Tall/mesoprosopic 24·00%.

3 Stature and nasal index

Table 90

Nasal index		Hyper-lepto-rhine	Lepto-rhine	Meso-rhine	Chamae-rhine	Hyper-chamae-rhine	Total
Stature	Tall	3	132	126	4	—	265
	Medium	1	13	16	3	1	34
	Small	—	—	1	—	—	1
	Total ...	4	145	143	7	1	300
Stature	Tall	1·00	44·00	42·00	1·33	—	88·33
	Medium	0·33	4·33	5·33	1·00	0·33	11·32
	Small	—	—	0·33	—	1·00	0·33
	Total ...	1·33	48·33	47·66	2·33	0·33	99·98

The two most frequently occurring combinations are: 1 tall/leptorrhine 44·00%, 2 tall/mesorrhine 42·00%.

4 Stature and eye colour

Table 91

	Eye colour	Brown	Intermediate	Light	Different	Total
Stature	Tall	73	127	64	1	265
	Medium	14	13	7	—	34
	Small	1	—	—	—	1
	Total	88	140	71	1	300
Stature	Tall	24·33	42·33	21·33	0·33	88·32
	Medium	4·67	4·33	2·33	—	11·33
	Small	0·33	—	—	—	0·33
	Total	29·33	46·66	23·66	0·33	99·98

The following three combinations have, in descending order of magnitude, the highest incidence: 1 tall/intermediate 42·33%, 2 tall/brown 24·33%, 3 tall/light 21·33%.

5 Stature and hair colour

Table 92

	Hair colour	Blond	Brown	Red	Mixed	Total
Stature	Tall	44	202	16	3	265
	Medium	5	28	—	1	34
	Small	—	1	—	—	1
	Total	49	231	16	4	300
Stature	Tall	14·67	67·33	5·33	1·00	88·33
	Medium	1·67	9·33	—	0·33	11·33
	Small	—	0·33	—	—	0·33
	Total	16·34	76·99	5·33	1·33	99·99

A little more than two thirds (67·33%) are tall and brown-haired.

6 Index cephalicus and morphological facial index

The following combinations have the highest incidence: 1 mesocephalic/euryprosopic 17·33%, 2 mesocephalic/leptoprosopic 13·33%, 3 mesocephalic/mesoprosopic 12·67%, 4 dolichocephalic/leptoprosopic 10·67%, 5 dolichocephalic/mesoprosopic 7·33%.

Table 93

Morphological facial index		Hyper- eury- prosopic	Eury- prosopic	Meso- prosopic	Lepto- prosopic	Hyper- lepto- prosopic	Total
Index cephalicus	Hyperdolichocephalic	—	1	—	1	—	2
	Dolichocephalic ...	4	14	22	32	16	88
	Mesocephalic ...	8	52	38	40	18	156
	Brachycephalic ...	1	14	14	12	2	43
	Hyperbrachycephalic	—	3	7	1	—	11
	Total	13	84	81	86	36	300
Index cephalicus	Hyperdolichocephalic	—	0·33	—	0·33	—	0·66
	Dolichocephalic ...	1·33	4·67	7·33	10·67	5·33	29·33
	Mesocephalic ...	2·67	17·33	12·67	13·33	6·00	52·00
	Brachycephalic ...	0·33	4·67	4·67	4·00	0·67	14·34
	Hyperbrachycephalic	—	1·00	2·33	0·33	—	3·66
	Total	4·33	28·00	27·00	28·66	12·00	99·99

7 *Index cephalicus and nasal index*

Table 94

Nasal index		Hyper- lepto- rrhine	Lepto- rrhine	Meso- rrhine	Chamae- rrhine	Hyper- chamae- rrhine	Total
Index cephalicus	Hyperdolichocephalic	—	—	2	—	—	2
	Dolichocephalic ...	1	45	41	1	—	88
	Mesocephalic ...	3	70	77	5	1	156
	Brachycephalic ...	—	23	19	1	—	43
	Hyperbrachycephalic	—	7	4	—	—	11
	Total	4	145	143	7	1	300
Index cephalicus	Hyperdolichocephalic	—	—	0·67	—	—	0·67
	Dolichocephalic ...	0·33	15·00	13·67	0·33	—	29·33
	Mesocephalic ...	1·00	23·33	25·67	1·67	0·33	52·00
	Brachycephalic ...	—	7·67	6·33	0·33	—	14·33
	Hyperbrachycephalic	—	2·33	1·33	—	—	3·66
	Total	1·33	48·33	47·67	2·33	0·33	99·99

The combinations with the highest incidence are: 1 mesocephalic/mesorrhine 25·67%, 2 mesocephalic/leptorrhine 23·33%, 3 dolichocephalic/leptorrhine 15·00%, dolichocephalic/mesorrhine 13·67%.

8 *Index cephalicus and eye colour*

In descending order of magnitude, the combinations with highest the incidence are: 1 mesocephalic/intermediate 24·67%, 2 mesocephalic/light 13·67%, 3 dolichocephalic/light 13·67%, 4 mesocephalic/brown 13·33%, 5 dolichocephalic/brown 10·00%.

Table 95

	Eye colour	Brown	Inter- mediate	Light	Different	Total
Index cephalicus	Hyperdolichocephalic ...	1	1	—	—	2
	Dolichocephalic ...	30	41	17	—	88
	Mesocephalic ...	40	74	41	1	156
	Brachycephalic ...	17	16	10	—	43
	Hyperbrachycephalic ...	—	8	3	—	11
	Total ...	88	140	71	1	300
Index cephalicus	Hyperdolichocephalic ...	0·33	0·33	—	—	0·66
	Dolichocephalic ...	10·00	13·67	5·67	—	29·34
	Mesocephalic ...	13·33	24·67	13·67	0·33	52·00
	Brachycephalic ...	5·67	5·33	3·33	—	14·33
	Hyperbrachycephalic ...	—	2·67	1·00	—	3·67
	Total ...	29·33	46·67	23·67	0·33	100·00

9 *Index cephalicus and hair colour*

The two combinations with the highest incidence are: 1 mesocephalic/brown, 39·00%, 2 dolichocephalic/brown 23·33%.

Table 96

	Hair colour	Blond	Brown	Red	Mixed	Total
Index cephalicus	Hyperdolichocephalic ...	—	2	—	—	2
	Dolichocephalic ...	15	70	1	2	88
	Mesocephalic ...	26	117	12	1	156
	Brachycephalic ...	4	35	3	1	43
	Hyperbrachycephalic ...	4	7	—	—	11
	Total ...	49	231	16	4	300
Index cephalicus	Hyperdolichocephalic ...	—	0·67	—	—	0·67
	Dolichocephalic ...	5·00	23·33	0·33	0·67	29·33
	Mesocephalic ...	8·67	39·00	4·00	0·33	52·00
	Brachycephalic ...	1·33	11·67	1·00	0·33	14·33
	Hyperbrachycephalic ...	1·33	2·33	—	—	3·66
	Total ...	16·33	77·00	5·33	1·33	99·99

10 *Morphological facial index and nasal index*

The five combinations with the highest incidence are: 1 euryprosopic/mesorrhine 17.00%, 2 leptoprosopic/leptorrhine 15.67%, 3 mesoprosopic/leptorrhine 13.67%, 4 mesoprosopic/mesorrhine 12.33%, 5 leptoprosopic/mesorrhine 12.00%.

Table 97

Nasal index		Hyper-lepto-rrhine	Lepto-rrhine	Meso-rrhine	Chamae-rrhine	Hyper-chamae-rrhine	Total
Morphological facial index	Hypereuryprosopic ...	—	4	8	1	—	13
	Euryprosopic ...	—	29	51	3	1	84
	Mesoprosopic ...	1	41	37	2	—	81
	Leptoprosopic ...	2	47	36	1	—	86
	Hyperleptoprosopic ...	1	24	11	—	—	36
	Total ...	4	145	143	7	1	300
Morphological facial index	Hypereuryprosopic ...	—	1.33	2.67	0.33	—	4.33
	Euryprosopic ...	—	9.67	17.00	1.00	0.33	28.00
	Mesoprosopic ...	0.33	13.67	12.33	0.67	—	27.00
	Leptoprosopic ...	0.67	15.67	12.00	0.33	—	28.67
	Hyperleptoprosopic ...	0.33	8.00	3.67	—	—	12.00
	Total ...	1.33	48.34	47.67	2.33	0.33	100.00

11 *Morphological facial index and eye colour*

The six combinations with the highest incidence are: 1 leptoprosopic/intermediate 13.33%, 2 mesoprosopic/intermediate 13.00%, euryprosopic/intermediate 12.67%, 4 mesoprosopic/brown 8.00%, 5 euryprosopic/brown 7.67%, 6 euryprosopic/light 7.33%.

Table 98

Eye colour		Brown	Inter-mediate	Light	Different	Total
Morphological facial index	Hypereuryprosopic ...	6	5	2	—	13
	Euryprosopic ...	23	38	22	1	84
	Mesoprosopic ...	24	39	18	—	81
	Leptoprosopic ...	31	40	15	—	86
	Hyperleptoprosopic ...	4	18	14	—	36
	Total ...	88	140	71	1	300
Morphological facial index	Hypereuryprosopic ...	2.00	1.67	0.67	—	4.34
	Euryprosopic ...	7.67	12.67	7.33	0.33	28.00
	Mesoprosopic ...	8.00	13.00	6.00	—	27.00
	Leptoprosopic ...	10.33	13.33	5.00	—	28.66
	Hyperleptoprosopic ...	1.33	6.00	4.67	—	12.00
	Total ...	29.33	46.67	23.67	0.33	100.00

12 Morphological facial index and hair colour

Table 99

Hair colour				Blond	Brown	Red	Mixed	Total
Morphological facial index	Hypereuryprosopic ...	...	...	1	12	—	—	13
	Euryprosopic ...	...	...	19	59	5	1	84
	Mesoprosopic ...	...	...	12	63	6	—	81
	Leptoprosopic ...	...	...	10	68	5	3	86
	Hyperleptoprosopic ...	...	...	7	29	—	—	36
	Total ...	...	...	49	231	16	4	300
Morphological facial index	Hypereuryprosopic ...	...	...	0·33	4·00	—	—	4·33
	Euryprosopic ...	...	...	6·33	19·67	1·67	0·33	28·00
	Mesoprosopic ...	...	...	4·00	21·00	2·00	—	27·00
	Leptoprosopic ...	...	...	3·33	22·67	1·67	1·00	28·67
	Hyperleptoprosopic ...	...	...	2·33	9·67	—	—	12·00
	Total ...	...	...	16·32	77·01	5·34	1·33	100·00

The three combinations with the highest incidence are: 1 leptoprosopic/brown 22·67%, 2 mesoprosopic/brown 21·00%, 3 euryprosopic/brown 19·67%.

13 Nasal index and eye colour

Table 100

Eye colour				Brown	Inter-mediate	Light	Different	Total
Nasal index	Hyperleptorrhine ...	...	...	1	—	3	—	4
	Leptorrhine ...	...	...	34	75	36	—	145
	Mesorrhine...	...	...	51	61	30	1	143
	Chamaerrhine ...	...	...	1	4	2	—	7
	Hyperchamaerrhine ...	...	...	1	—	—	—	1
	Total ...	...	...	88	140	71	1	300
Nasal index	Hyperleptorrhine ...	...	...	0·33	—	1·00	—	1·33
	Leptorrhine ...	...	...	11·33	25·00	12·00	—	48·33
	Mesorrhine...	...	...	17·00	20·33	10·00	0·33	47·66
	Chamaerrhine ...	...	...	0·33	1·33	0·67	—	2·33
	Hyperchamaerrhine ...	...	...	0·33	—	—	—	0·33
	Total ...	...	...	29·32	46·66	23·67	0·33	99·98

In the combination nasal index/eye colour the highest frequencies are: 1 leptorrhine/intermediate 25·00%, 2 mesorrhine/intermediate 20·33%, 3 mesorrhine/brown 17·00%.

14 Nasal index and hair colour

The two combinations with the highest frequencies are: 1 mesorrhine/brown 39·33%, 2 leptorrhine/brown 34·33%.

Table 101

Hair colour			Blond	Brown	Red	Mixed	Total
Nasal index	Hyperleptorrhine ...	...	—	4	—	—	4
	Leptorrhine ...	...	33	103	7	2	145
	Mesorrhine...	...	14	118	9	2	143
	Chamaerrhine ...	...	2	5	—	—	7
	Hyperchamaerrhine ...	...	—	—	—	—	1
	Total ...	...	49	231	16	4	300
Nasal index	Hyperleptorrhine ...	...	—	1·33	—	—	1·33
	Leptorrhine ...	...	11·00	34·33	2·33	0·67	48·33
	Mesorrhine...	...	4·67	39·33	3·00	0·67	47·67
	Chamaerrhine ...	...	0·67	1·67	—	—	2·34
	Hyperchamaerrhine ...	...	—	0·33	—	—	0·33
	Total ...	...	16·34	76·99	5·33	1·34	100·00

15 Hair form and hair colour

Table 102

Hair colour		Light blond	Blond	Dark blond	Brown	Black-brown	Red	Mixed	Two colours	Total
Hair form	Straight ...	1	19	9	39	67	5	3	1	144
	Waves flat ...	—	4	3	18	30	2	1	—	58
	Waves broad ...	—	4	—	8	11	1	2	—	26
	Waves narrow ...	—	—	—	4	3	—	1	—	8
	Curly ...	—	—	—	—	1	—	—	—	1
	Total ...	1	27	12	69	112	8	7	1	237
Hair form	Straight ...	0·42	8·02	3·80	16·46	28·27	2·11	1·27	0·42	60·77
	Waves flat ...	—	1·69	1·27	7·60	12·66	0·84	0·42	—	24·48
	Waves broad ...	—	1·69	—	3·38	4·67	0·42	0·84	—	11·00
	Waves narrow ...	—	—	—	1·69	1·27	—	0·42	—	3·38
	Curly ...	—	—	—	—	0·42	—	—	—	0·42
	Total ...	0·42	11·40	5·07	29·13	47·29	3·37	2·95	0·42	100·05

The most frequently occurring combinations are: 1 black-brown/straight 28·27%, 2 brown/straight 16·46%.

16 Eye colour and hair colour

Table 103

		Light blond	Blond	Dark blond	Brown	Black-brown	Red	Mixed	Two colours	Total
Eye colour	Brown ...	1	2	3	24	51	2	4	1	88
	Intermediate ...	—	11	8	45	62	10	4	—	140
	Light ...	1	14	9	26	17	4	—	—	71
	Different ...	—	—	—	—	1	—	—	—	1
	Total ...	2	27	20	95	131	16	8	1	300
Eye colour.	Brown ...	0·33	0·67	1·00	8·00	17·00	0·67	1·33	0·33	29·33
	Intermediate ...	—	3·67	2·67	15·00	20·67	3·33	1·33	—	46·67
	Light ...	0·33	4·67	3·00	8·67	5·67	1·33	—	—	23·67
	Different ...	—	—	—	—	0·33	—	—	—	0·33
	Total ...	0·66	9·01	6·67	31·67	43·67	5·33	2·66	0·33	100·00

The three combinations with the highest incidence are: 1 black-brown/intermediate 20·67%, 2 black-brown/brown 17·00%, 3 brown/intermediate 15·00%.

17 Profile of the nose and occiput

Table 104

Profile of the occiput		Flat	Arched	Prominant	Total
Profile of the nose	Straight ...	8	48	39	95
	Convex ...	7	31	37	75
	Concave ...	1	6	3	10
	Wavy ...	3	27	27	57
	Total ...	19	112	106	237
Profile of the nose	Straight ...	3·38	20·26	16·46	40·10
	Convex ...	2·95	13·08	15·61	31·64
	Concave ...	0·42	2·53	1·27	4·22
	Wavy ...	1·27	11·39	11·39	24·05
	Total ...	8·02	47·26	44·73	100·01

The three combinations of the profile of the nose and occiput with the highest incidence are: 1 straight/arched 20·26%, 2 straight/prominent 16·46%, 3 convex/prominent 15·61%.

(b) Three character combinations

For the 3-character combinations the following character combinations were selected: 1 stature, index cephalicus and eye colour; 2 index cephalicus, morphological facial index and nasal index; 3 index cephalicus, nasal index and eye colour; and 4 morphological facial index, eye colour and hair colour.

1 Stature, index cephalicus and eye colour

Table 105

No.	Stature			Index cephalicus			Eye colour			Frequency	
										absolute	%
1	tall	...	...	mesocephalic	...	...	intermediate	...	...	68	22.67
2	tall	...	...	dolichocephalic	...	...	intermediate	...	...	39	13.00
3	tall	...	...	mesocephalic	...	...	light	...	...	37	12.33
4	tall	...	...	mesocephalic	...	...	brown	...	...	32	10.67
5	tall	...	...	dolichocephalic	...	...	brown	...	...	29	9.67
6	tall	...	...	dolichocephalic	...	...	light	...	...	16	5.33
7	tall	...	...	brachycephalic	...	...	intermediate	...	...	14	4.67
8	tall	...	...	brachycephalic	...	...	brown	...	...	12	4.00
9	tall	...	...	brachycephalic	...	...	light	...	...	9	3.00
10	medium	...	...	mesocephalic	...	...	brown	...	...	8	2.67
11	tall	...	...	hyperbrachycephalic	...	...	intermediate	...	...	6	2.00
12	medium	...	...	mesocephalic	...	...	intermediate	...	...	6	2.00
13	medium	...	...	brachycephalic	...	...	brown	...	...	5	1.67
14	medium	...	...	mesocephalic	...	...	light	...	...	4	1.33
15	tall	...	...	dolichocephalic	...	...	intermediate	...	...	3	1.00
16	tall	...	...	hyperbrachycephalic	...	...	light	...	...	2	0.67
17	medium	...	...	brachycephalic	...	...	intermediate	...	...	2	0.67
18	medium	...	...	hyperbrachycephalic	...	...	intermediate	...	...	2	0.67
19	tall	...	...	mesocephalic	...	...	different	...	...	1	0.33
20	medium	...	...	dolichocephalic	...	...	brown	...	...	1	0.33
21	medium	...	...	dolichocephalic	...	...	light	...	...	1	0.33
22	medium	...	...	brachycephalic	...	...	light	...	...	1	0.33
23	medium	...	...	hyperbrachycephalic	...	...	light	...	...	1	0.33
24	small	...	...	dolichocephalic	...	...	brown	...	...	1	0.33

2 Index cephalicus, morphological facial index and nasal index

Table 106

No.	Index cephalicus			Morphological facial index			Nasal index			Frequency	
										absolute	%
1	mes.	...	...	eury.	...	...	mes.	...	...	13	11.00
2	mes.	...	...	lept.	...	...	lept.	...	...	23	7.67
3	mes.	...	...	mes.	...	...	mes.	...	...	19	6.33
4	dol.	...	...	lept.	...	...	lept.	...	...	17	5.67
5	mes.	...	...	mes.	...	...	lept.	...	...	17	5.67
6	mes.	...	...	lept.	...	...	mes.	...	...	16	5.33

No.	Index cephalicus	Morphological facial index	Nasal index	Frequency	
				absolute	%
7	mes.	eury.	lept.	15	5.00
8	dol.	lept.	mes.	14	4.67
9	dol.	mes.	lept.	13	4.33
10	mes.	hyperlept.	lept.	12	4.00
11	dol.	eury.	mes.	11	3.67
12	dol.	hyperlept.	lept.	10	3.33
13	dol.	mes.	mes.	9	3.00
14	brach.	eury.	lept.	8	2.67
15	brach.	mes.	lept.	7	2.33
16	dol.	hyperlept.	mes.	6	2.00
17	brach.	eury.	mes.	6	2.00
18	brach.	mes.	mes.	6	2.00
19	brach.	lept.	lept.	6	2.00
20	brach.	lept.	mes.	6	2.00
21	mes.	hyperlept.	mes.	5	1.67
22	dol.	eury.	lept.	4	1.33
23	mes.	hypereury.	mes.	4	1.33
24	hyperbrach.	mes.	lept.	4	1.33
25	dol.	hypereury.	mes.	3	1.00
26	mes.	hypereury.	lept.	3	1.00
27	mes.	eury.	cham.	3	1.00
28	hyperbrach.	mes.	mes.	3	1.00
29	brach.	hyperlept.	lept.	2	0.67
30	hyperbrach.	eury.	lept.	2	0.67
31	dol.	hypereury.	lept.	1	0.33
32	dol.	lept.	hyperlept.	1	0.33
33	dol.	lept.	cham.	1	0.33
34	mes.	hypereury.	cham.	1	0.33
35	mes.	eury.	hypercham.	1	0.33
36	mes.	mes.	hyperlept.	1	0.33
37	mes.	mes.	cham.	1	0.33
38	mes.	lept.	hyperlept.	1	0.33
39	mes.	hyperlept.	hyperlept.	1	0.33
40	brach.	hypereury.	mes.	1	0.33
41	brach.	mes.	cham.	1	0.33
42	hyperbrach.	eury.	mes.	1	0.33
43	hyperbrach.	lept.	lept.	1	0.33

3 *Index cephalicus, nasal index and eye colour*

Table 107

No.	Index cephalicus	Nasal index	Eye colour	Frequency	
				absolute	%
1	mes.	lept.	intermed.	37	12.33
2	mes.	mes.	intermed.	33	11.00
3	dol.	lept.	intermed.	25	8.33
4	mes.	mes.	brown	25	8.33
5	dol.	mes.	brown	20	6.67

No.	Index cephalicus	Nasal index	Eye colour	Frequency	
				absolute	%
6	mes.	lept.	light	20	6·67
7	mes.	mes.	light	18	6·00
8	dol.	mes.	intermed.	17	5·67
9	mes.	lept.	brown	13	4·33
10	dol.	lept.	brown	11	3·67
11	brach.	lept.	brown	10	3·33
12	dol.	lept.	light	9	3·00
13	brach.	lept.	intermed.	8	2·67
14	brach.	mes.	intermed.	8	2·67
15	dol.	mes.	light	6	2·00
16	brach.	mes.	brown	6	2·00
17	brach.	lept.	light	5	1·67
18	brach.	mes.	light	5	1·67
19	hyperbrach.	lept.	intermed.	5	1·67
20	mes.	cham.	intermed.	4	1·33
21	hyperbrach.	mes.	intermed.	3	1·00
22	mes.	hyperlept.	light	2	0·67
23	hyperbrach.	lept.	light	2	0·67
24	dol.	hyperlept.	light	1	0·33
25	dol.	cham.	light	1	0·33
26	mes.	hyperlept.	brown	1	0·33
27	mes.	mes.	diff.	1	0·33
28	mes.	cham.	light	1	0·33
29	mes.	hypercham.	brown	1	0·33
30	brach.	cham.	brown	1	0·33
31	hyperbrach.	mes.	light	1	0·33

4 Morphological facial index, eye colour and hair colour

Table 108

No.	Morphological facial index	Eye colour	Hair colour	Frequency	
				absolute	%
1	lept.	intermed.	brown	32	10·67
2	mes.	intermed.	brown	30	10·00
3	eury.	intermed.	brown	28	9·33
4	lept.	brown	brown	28	9·33
5	mes.	brown	brown	23	7·67
6	eury.	brown	brown	18	6·00
7	hyperlept.	intermed.	brown	15	5·00
8	eury.	light	brown	12	4·00
9	hyperlept.	light	brown	11	3·67
10	mes.	light	brown	10	3·33
11	eury.	light	blond	9	3·00
12	eury.	intermed.	blond	8	2·67
13	lept.	light	brown	8	2·67
14	hypereury.	brown	brown	6	2·00
15	mes.	light	blond	6	2·00

No.	Morphological facial index	Eye colour	Hair colour	Frequency	
				absolute	%
16	lept. ...	light ...	blond ...	6	2.00
17	mes. ...	intermed. ...	blond ...	5	1.67
18	hyperury. ...	intermed. ...	brown ...	4	1.33
19	mes. ...	intermed. ...	red ...	4	1.33
20	lept. ...	intermed. ...	red ...	4	1.33
21	hyperlept. ...	intermed. ...	blond ...	3	1.00
22	hyperlept. ...	light ...	blond ...	3	1.00
23	hyperlept. ...	brown ...	brown ...	3	1.00
24	hyperury. ...	light ...	brown ...	2	0.67
25	ury. ...	brown ...	blond ...	2	0.67
26	ury. ...	brown ...	red ...	2	0.67
27	ury. ...	intermed. ...	red ...	2	0.67
28	mes. ...	light ...	red ...	2	0.67
29	lept. ...	brown ...	blond ...	2	0.67
30	lept. ...	intermed. ...	blond ...	2	0.67
31	lept. ...	intermed. ...	mix. ...	2	0.67
32	hyperury. ...	intermed. ...	blond ...	1	0.33
33	ury. ...	brown ...	mix. ...	1	0.33
34	ury. ...	different ...	brown ...	1	0.33
35	ury. ...	light ...	red ...	1	0.33
36	mes. ...	brown ...	blond ...	1	0.33
37	lept. ...	light ...	red ...	1	0.33
38	lept. ...	brown ...	mix. ...	1	0.33
39	hyperlept. ...	brown ...	blond ...	1	0.33

(c) Combination of six characters

For the 6-character combination those characters used by Schlaginhaufen (1939, 1946) and his students Büchi (1942) and Hess (1950), were selected. The combination consists of one absolute metrical measurement: the stature; three indices: index cephalicus, morphological facial index, and the nasal index; and two anthroposopical characters: eye colour and hair colour. The number of categories for each are: stature 3, index cephalicus 4, morphological facial index 5, nasal index 5, eye colour 4, and hair colour 4. The class boundaries for each are the following: stature: —159.9, small; 160.0—169.9, medium; 170.0—, tall. Index cephalicus —75.9, dolichocephalic; 76.0—80.9, mesocephalic; 81.0—85.4, brachycephalic; 85.5—, hyperbrachycephalic. Morphological facial index: —78.9, hyperuryprosopic; 79.0—83.9, euryprosopic; 84.0—87.9, mesoprosopic; 88.0—92.9, leptoprosopic; 93.0—, hyperleptoprosopic. Nasal index: —54.9, hyperleptorrhine; 55.0—69.9, leptorrhine; 70.0—84.9, messorrhine; 85.0—99.9, chamaerrhine; 100.0—, hyperchamaerrhine.

Hair colour:

Fischer Nos.	8, 8—9, 12 to 26	...	blond;
"	"	4 to 7—8, 26—27 to 30	brown;
"	"	1 to 3, 9 to 11—12	red;
Mixed and two colours	...	...	mix.

Eye colour:

Martin Nos.	1 to 6—7		...	...	brown;
	7 to 12—13		...	...	intermediate;
	13 to 16		...	...	light;
Different	...	...	...	...	diff.

There are 154 different combinations, classified below in diminishing order of frequency:

Table 109

Combination of stature, index cephalicus, morphological facial index, nasal index, eye colour, and hair colour.

No	Stature	Index cephalicus	Morphological facial index	Nasal index	Eye colour	Hair colour	Frequency
1	tall ...	dol. ...	lept. ...	lept. ...	intermed.	brown	3·67
2	tall ...	mes. ...	lept. ...	lept. ...	intermed.	brown	3·33
3	tall ...	mes. ...	eury. ...	lept. ...	intermed.	brown	2·33
4	tall ...	mes. ...	eury. ...	mes. ...	brown ...	brown	2·33
5	tall ...	mes. ...	eury. ...	mes. ...	intermed.	brown	2·33
6	tall ...	mes. ...	mes. ...	mes. ...	intermed.	brown	2·33
7	tall ...	mes. ...	mes. ...	lept. ...	intermed.	brown	2·00
8	tall ...	dol. ...	mes. ...	lept. ...	intermed.	brown	1·67
9	tall ...	dol. ...	lept. ...	mes. ...	brown ...	brown	1·67
10	tall ...	mes. ...	eury. ...	mes. ...	light ...	brown	1·67
11	tall ...	mes. ...	mes. ...	mes. ...	brown ...	brown	1·67
12	tall ...	mes. ...	lept. ...	mes. ...	brown ...	brown	1·67
13	tall ...	dol. ...	eury. ...	mes. ...	brown ...	brown	1·33
14	tall ...	dol. ...	mes. ...	mes. ...	intermed.	brown	1·33
15	tall ...	dol. ...	lept. ...	lept. ...	brown ...	brown	1·33
16	tall ...	dol. ...	hyperlept.	lept. ...	intermed.	brown	1·33
17	tall ...	mes. ...	eury. ...	mes. ...	intermed.	blond	1·33
18	tall ...	mes. ...	mes. ...	lept. ...	brown ...	brown	1·33
19	tall ...	mes. ...	lept. ...	mes. ...	intermed.	brown	1·33
20	tall ...	mes. ...	hyperlept.	lept. ...	intermed.	brown	1·33
21	tall ...	brach. ...	eury. ...	lept. ...	intermed.	brown	1·33
22	tall ...	brach. ...	lept. ...	lept. ...	brown ...	brown	1·33
23	tall ...	dol. ...	eury. ...	lept. ...	light ...	blond	1·00
24	tall ...	dol. ...	mes. ...	lept. ...	brown ...	brown	1·00
25	tall ...	dol. ...	mes. ...	mes. ...	brown ...	brown	1·00
26	tall ...	dol. ...	lept. ...	mes. ...	intermed.	brown	1·00
27	tall ...	dol. ...	hyperlept.	lept. ...	light ...	brown	1·00
28	tall ...	dol. ...	hyperlept.	mes. ...	intermed.	brown	1·00
29	tall ...	mes. ...	eury. ...	lept. ...	light ...	brown	1·00
30	tall ...	mes. ...	lept. ...	lept. ...	light ...	blond	1·00
31	tall ...	mes. ...	lept. ...	lept. ...	brown ...	brown	1·00
32	tall ...	mes. ...	lept. ...	lept. ...	light ...	brown	1·00
33	tall ...	mes. ...	hyperlept.	lept. ...	light ...	brown	1·00
34	tall ...	brach. ...	eury. ...	mes. ...	intermed.	brown	1·00
35	tall ...	brach. ...	mes. ...	lept. ...	brown ...	brown	1·00
36	tall ...	dol. ...	hypereury.	mes. ...	brown ...	brown	0·67
37	tall ...	dol. ...	mes. ...	lept. ...	intermed.	blond	0·67
38	tall ...	dol. ...	mes. ...	lept. ...	light ...	brown	0·67
39	tall ...	dol. ...	lept. ...	mes. ...	light ...	brown	0·67
40	tall ...	mes. ...	hypereury.	mes. ...	light ...	brown	0·67

No	Stature	Index cephalicus	Morphological facial index	Nasal index	Eye colour	Hair colour	Frequency
41	tall ...	mes. ...	eury. ...	lept. ...	intermed.	blond	0·67
42	tall ...	mes. ...	eury. ...	cham. ...	intermed.	brown	0·67
43	tall ...	mes. ...	mes. ...	lept. ...	light ...	blond	0·67
44	tall ...	mes. ...	mes. ...	lept. ...	light ...	brown	0·67
45	tall ...	mes. ...	mes. ...	mes. ...	intermed.	red ...	0·67
46	tall ...	mes. ...	lept. ...	lept. ...	intermed.	red ...	0·67
47	tall ...	mes. ...	lept. ...	mes. ...	light ...	blond	0·67
48	tall ...	mes. ...	lept. ...	mes. ...	intermed.	red ...	0·67
49	tall ...	mes. ...	hyperlept. ...	lept. ...	brown ...	brown	0·67
50	tall ...	mes. ...	hyperlept. ...	mes. ...	light ...	brown	0·67
51	tall ...	brach. ...	mes. ...	mes. ...	intermed.	brown	0·67
52	tall ...	brach. ...	lept. ...	mes. ...	brown ...	brown	0·67
53	tall ...	brach. ...	lept. ...	mes. ...	intermed.	brown	0·67
54	medium	mes. ...	eury. ...	mes. ...	brown ...	brown	0·67
55	medium	mes. ...	eury. ...	mes. ...	intermed.	brown	0·67
56	medium	mes. ...	lept. ...	mes. ...	brown ...	brown	0·67
57	medium	brach. ...	eury. ...	lept. ...	brown ...	brown	0·67
58	tall ...	dol. ...	hypereury. ...	lept. ...	brown ...	brown	0·33
59	tall ...	dol. ...	hypereury. ...	mes. ...	intermed.	brown	0·33
60	tall ...	dol. ...	eury. ...	lept. ...	light ...	brown	0·33
61	tall ...	dol. ...	eury. ...	mes. ...	brown ...	blond	0·33
62	tall ...	dol. ...	eury. ...	mes. ...	intermed.	blond	0·33
63	tall ...	dol. ...	eury. ...	mes. ...	light ...	blond	0·33
64	tall ...	dol. ...	eury. ...	mes. ...	intermed.	brown	0·33
65	tall ...	dol. ...	eury. ...	mes. ...	light ...	brown	0·33
66	tall ...	dol. ...	eury. ...	mes. ...	brown ...	red ...	0·33
67	tall ...	dol. ...	eury. ...	mes. ...	brown ...	mix. ...	0·33
68	tall ...	dol. ...	mes. ...	mes. ...	brown ...	blond	0·33
69	tall ...	dol. ...	mes. ...	mes. ...	light ...	brown	0·33
70	tall ...	dol. ...	lept. ...	hyperlept.	light ...	brown	0·33
71	tall ...	dol. ...	lept. ...	lept. ...	brown ...	blond	0·33
72	tall ...	dol. ...	lept. ...	mes. ...	brown ...	blond	0·33
73	tall ...	dol. ...	lept. ...	mes. ...	intermed.	blond	0·33
74	tall ...	dol. ...	lept. ...	mes. ...	intermed.	mix. ...	0·33
75	tall ...	dol. ...	hyperlept.	lept. ...	brown ...	blond	0·33
76	tall ...	dol. ...	hyperlept.	lept. ...	intermed.	blond	0·33
77	tall ...	dol. ...	hyperlept.	mes. ...	intermed.	blond	0·33
78	tall ...	dol. ...	hyperlept.	mes. ...	light ...	brown	0·33
79	tall ...	mes. ...	hypereury. ...	lept. ...	intermed.	brown	0·33
80	tall ...	mes. ...	hypereury. ...	mes. ...	brown ...	brown	0·33
81	tall ...	mes. ...	hypereury. ...	mes. ...	intermed.	brown	0·33
82	tall ...	mes. ...	hypereury. ...	cham. ...	intermed.	blond	0·33
83	tall ...	mes. ...	eury. ...	lept. ...	light ...	blond	0·33
84	tall ...	mes. ...	eury. ...	lept. ...	brown ...	brown	0·33
85	tall ...	mes. ...	eury. ...	mes. ...	brown ...	blond	0·33
86	tall ...	mes. ...	eury. ...	mes. ...	light ...	blond	0·33
87	tall ...	mes. ...	eury. ...	mes. ...	diff. ...	brown	0·33
88	tall ...	mes. ...	eury. ...	mes. ...	brown ...	red ...	0·33
89	tall ...	mes. ...	eury. ...	mes. ...	intermed.	red ...	0·33
90	tall ...	mes. ...	eury. ...	mes. ...	light ...	red ...	0·33
91	tall ...	mes. ...	mes. ...	hyperlept.	light ...	brown	0·33
92	tall ...	mes. ...	mes. ...	lept. ...	intermed.	blond	0·33
93	tall ...	mes. ...	mes. ...	lept. ...	intermed.	red ...	0·33
94	tall ...	mes. ...	mes. ...	lept. ...	light ...	red ...	0·33
95	tall ...	mes. ...	mes. ...	mes. ...	light ...	blond	0·33
96	tall ...	mes. ...	mes. ...	mes. ...	light ...	brown	0·33
97	tall ...	mes. ...	mes. ...	mes. ...	light ...	red ...	0·33

No	Stature	Index cephalicus	Morphological facial index	Nasal index	Eye colour	Hair colour	Frequency
98	tall ...	mes. ...	lept. ...	lept. ...	brown ...	mix. ...	0·33
99	tall ...	mes. ...	lept. ...	mes. ...	intermed.	blond	0·33
100	tall ...	mes. ...	hyperlept.	hyperlept.	light ...	brown	0·33
101	tall ...	mes. ...	hyperlept.	lept. ...	intermed.	blond	0·33
102	tall ...	mes. ...	hyperlept.	lept. ...	light ...	blond	0·33
103	tall ...	mes. ...	hyperlept.	mes. ...	brown ...	brown	0·33
104	tall ...	mes. ...	hyperlept.	mes. ...	intermed.	brown	0·33
105	tall ...	brach. ...	eury. ...	lept. ...	light ...	brown	0·33
106	tall ...	brach. ...	eury. ...	lept. ...	intermed.	red. ...	0·33
107	tall ...	brach. ...	eury. ...	mes. ...	light ...	blond	0·33
108	tall ...	brach. ...	eury. ...	mes. ...	brown ...	brown	0·33
109	tall ...	brach. ...	mes. ...	lept. ...	light ...	blond	0·33
110	tall ...	brach. ...	mes. ...	lept. ...	light ...	brown	0·33
111	tall ...	brach. ...	mes. ...	lept. ...	intermed.	red ...	0·33
112	tall ...	brach. ...	mes. ...	mes. ...	brown ...	brown	0·33
113	tall ...	brach. ...	mes. ...	mes. ...	light ...	brown	0·33
114	tall ...	brach. ...	mes. ...	cham. ...	brown ...	brown	0·33
115	tall ...	brach. ...	lept. ...	lept. ...	light ...	red ...	0·33
116	tall ...	brach. ...	lept. ...	mes. ...	light ...	blond	0·33
117	tall ...	brach. ...	lept. ...	mes. ...	light ...	brown	0·33
118	tall ...	brach. ...	hyperlept.	lept. ...	intermed.	brown	0·33
119	tall ...	brach. ...	hyperlept.	lept. ...	light ...	brown	0·33
120	tall ...	hyperbrach.	eury. ...	lept. ...	light ...	blond	0·33
121	tall ...	hyperbrach.	eury. ...	lept. ...	intermed.	brown	0·33
122	tall ...	hyperbrach.	mes. ...	lept. ...	intermed.	blond	0·33
123	tall ...	hyperbrach.	mes. ...	lept. ...	light ...	blond	0·33
124	tall ...	hyperbrach.	mes. ...	lept. ...	intermed.	brown	0·33
125	tall ...	hyperbrach.	mes. ...	mes. ...	intermed.	blond	0·33
126	tall ...	hyperbrach.	mes. ...	mes. ...	intermed.	brown	0·33
127	tall ...	hyperbrach.	lept. ...	lept. ...	intermed.	brown	0·33
128	medium	dol. ...	mes. ...	lept. ...	brown ...	brown	0·33
129	medium	dol. ...	lept. ...	lept. ...	intermed.	brown	0·33
130	medium	dol. ...	lept. ...	cham. ...	light ...	brown	0·33
131	medium	dol. ...	hyperlept.	lept. ...	intermed.	brown	0·33
132	medium	dol. ...	hyperlept.	mes. ...	intermed.	brown	0·33
133	medium	mes. ...	hypereury.	lept. ...	brown ...	brown	0·33
134	medium	mes. ...	hypereury.	lept. ...	intermed.	brown	0·33
135	medium	mes. ...	eury. ...	lept. ...	intermed.	brown	0·33
136	medium	mes. ...	eury. ...	cham. ...	intermed.	blond	0·33
137	medium	mes. ...	eury. ...	hypercham.	brown ...	brown	0·33
138	medium	mes. ...	mes. ...	mes. ...	light ...	blond	0·33
139	medium	mes. ...	mes. ...	mes. ...	intermed.	brown	0·33
140	medium	mes. ...	mes. ...	cham. ...	light ...	brown	0·33
141	medium	mes. ...	lept. ...	hyperlept.	brown ...	brown	0·33
142	medium	mes. ...	lept. ...	lept. ...	brown ...	brown	0·33
143	medium	mes. ...	hyperlept.	lept. ...	light ...	blond	0·33
144	medium	mes. ...	hyperlept.	mes. ...	light ...	blond	0·33
145	medium	brach. ...	hypereury.	mes. ...	brown ...	brown	0·33
146	medium	brach. ...	eury. ...	mes. ...	light ...	blond	0·33
147	medium	brach. ...	mes. ...	lept. ...	brown ...	brown	0·33
148	medium	brach. ...	mes. ...	mes. ...	brown ...	brown	0·33
149	medium	brach. ...	mes. ...	mes. ...	intermed.	brown	0·33
150	medium	brach. ...	lept. ...	lept. ...	intermed.	mix. ...	0·33
151	medium	hyperbrach.	eury. ...	mes. ...	light ...	brown	0·33
152	medium	hyperbrach.	mes. ...	lept. ...	intermed.	brown	0·33
153	medium	hyperbrach.	mes. ...	mes. ...	intermed.	brown	0·33
154	small ...	dol. ...	lept. ...	mes. ...	brown ...	brown	0·33

The highest incidence among the 154 different combinations is 3.67%, and that is not high enough to be regarded as typical of the students.

On the basis of Deniker's criteria (Schlaginhaufen, 1946) for the identification of the various racial types given below, only 17 individuals (5.67%) were found to be racially "pure"; the remainder are of mixed origin, made up of components from the races as enumerated.

(a) Nordic Race (*Homo europaeus*)

The Nordic race, more or less corresponding to the Scandinavian, Teutonic, Germanic and Kymric races of various authors (Vallois, 1952) is characterized by a tall stature, mesocephalic to dolichocephalic index cephalicus, leptoprosopic to hyperleptoprosopic facial index, leptorrhine to hyperleptorrhine nasal index, light eyes and blond hair. The combinations considered to be typical for this race, are the following:

No. 30	tall	mes.	lept.	lept.	light	blond	1.00%
No. 102	tall	mes.	hyperlept.	lept.	light	blond	0.33%

(b) East Baltic Race (*Homo vistulensis*)

The East Baltic race, also described as the East European race or the Oriental race (Coon, 1939), is a medium tall, brachycephalic, mesoprosopic to hypereuryprosopic, mesorrhine to chamaerrhine race with light eyes and blond hair. The combination typical for this race, is the following:

No. 146	medium	brach.	eury.	mes.	light	blond	0.33%
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(c) Ibero-Insular Race (*Homo mediterraneus*)

The six typical characters, namely small to medium tall, dolichocephalic head index, leptoprosopic to hyperleptoprosopic facial index, mesorrhine to leptorrhine nasal index, brown eyes, and brown hair of the Ibero-Insular race or the Mediterranean race (Hooton 1946), occur twice in Table 107:

No. 128	medium	dol.	mes.	lept.	brown	brown	0.33%
No. 154	small	dol.	lept.	mes.	brown	brown	0.33%

(d) Alpine Race (*Homo alpinus*)

The six characters considered to be typical for the Alpine race, are: medium tall stature, brachycephalic to hyperbrachycephalic index cephalicus, mesoprosopic to hypereuryprosopic facial index, mesorrhine nasal index, intermediate or brown eyes, and brown hair. Three subjects presented combinations of these characters:

No. 145	medium	brach.	hypereury.	mes.	brown	brown	0.33%
No. 148	medium	brach.	mes.	mes.	brown	brown	0.33%
No. 149	medium	brach.	mes.	mes.	intermed.	brown	0.33%

(e) Atlanto-Mediterranean Race (*Homo atlanto-mediterraneus*)

The Atlanto-Mediterranean race, also called the Littoral European race (Coon, 1939, Schlaginhaufen, 1946) is a medium tall, mesocephalic, leptoprosopic to

hyperleptoprosopic, mesorrhine to leptorrhine, brown-eyed, and brown-haired race. The following combinations are considered to be typical of this race:

No. 56	medium	mes.	lept.	mes.	brown	brown	0.67%
No. 142	medium	mes.	lept.	lept.	brown	brown	0.33%

(f) Dinaric Race (*Homo adriaticus*)

The Dinaric or Adriatic race is characterized by a tall stature, brachycephalic to hyperbrachycephalic index cephalicus, leptoprosopic to hyperleptoprosopic facial index, leptorrhine to hyperleptorrhine nasal index, brown eyes, and brown hair. This combination of the six racial characters was present in four subjects:

No. 22	tall	brach.	lept.	lept.	brown	brown	1.33%
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In diminishing order of frequency, Deniker's six European races occur in the students examined as follows:

Nordic race	...	...	...	4	1.33%
Dinaric race	...	...	...	4	1.33%
Atlanto-Mediterranean race	...	...	...	3	1.00%
Alpine race...	...	...	...	3	1.00%
Mediterranean race	...	...	...	2	0.67%
East Baltic race	...	...	...	1	0.33%
Total	...	...	...	17	5.67%

VII SUMMARY AND CONCLUSIONS

Three hundred male students at the University of Stellenbosch were selected at random and a number of somatometrical measurements and somatoscopical observations were recorded according to the methods of Martin (1928) which are used universally. These were: 10 linear dimensions, seven measurements relative to stature, eight indices, the colour of the hair, eyes and skin, the profile of the nose and the occiput and the form of the hair.

The measurements and somatoscopical observations are recorded in tabular form together with the arithmetic means and other statistical values.

The percentage frequencies of 17 2-character combinations four 3-character combinations and a 6-character combination were determined. These are also presented in tabular form.

According to the mean values and the character combinations the students can be described as tall, mesocephalic, mesoprosopic to leptoprosopic, leptorrhine to mesorrhine with brown hair and intermediate eye colour.

Other interesting features are the high percentage of red hair (6.33%), the practical absence of black and light blond hair and the high percentage of supernumerary mammae (7.18%) and epicanthus (32.7%).

By applying Deniker's (1904) and Schlaginhaufen's (1927, 1946) criteria, the percentage distribution of the anthropological European races was determined. Only 17 individuals (5.67%) are racially "pure", the rest are made up of components of the races as enumerated. The frequencies of the racially "pure" individuals are as follows: Nordic race, 1.33%; Dinaric race, 1.33%; Atlanto-Mediterranean race, 1.00%; Alpine race, 1.00%; Mediterranean race, 0.67%; East Baltic race, 0.33%.

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* Not seen in the original.

